

FUELS MANAGEMENT

I. INTRODUCTION

Wildland fuel complexes within National Park Service units are managed to achieve resource benefits and management goals such as hazard fuels reduction, ecosystem restoration, and maintaining ecosystem health. Fuels management includes strategic planning and implementation of treatments ranging in scale from site specific to landscape level. These treatments are designed to improve the park's ability to protect life and property, and to maintain or restore the sustainability of healthy ecosystems, which is a fundamental legislative mandate of many National Park Service units.

Ecosystem restoration projects restore ecosystem health by controlling fire-promoting non-native plants and increasing the diversity of habitat available to plants and animals. Hazard fuel reduction projects remove excessive live or dead fuel to protect life and property, including communities at risk and municipal watersheds; natural resources, including critical native plant communities and their processes, and threatened and endangered species; and important cultural resources. These treatments, a variety of fire and non-fire techniques, include, but are not limited to, prescribed fire and wildland fire use, mechanical, chemical, biological, and manual methods. Many projects are designed to achieve both purposes simultaneously. Both naturally occurring fuels and hazard fuels accumulations resulting from resource management and land use activities must be addressed.

Fuels management strategies are described in three sections in this chapter: prescribed fire, non-fire treatments (mechanical, chemical, biological, and manual methods) and debris disposal. Wildland fire use treatments are addressed in Chapter 9: Wildland Fire. Prior to implementing fuels management treatments, parks shall identify appropriate applications through approved management plans. All activities defined in this chapter may be accomplished through contracts and use of sources outside the National Park Service in accordance with established Departmental, Bureau, and Agency policies and valid agreements.

In some areas, fire is an integral component of the ecosystem and as a consequence is managed as a natural process throughout all or portions of the park unit. In other areas where fire is an essential component of the ecosystem but cannot be allowed to burn as a natural process because of management constraints, prescribed fire may be used as a tool to accomplish resource management objectives. In addition, fire and/or non-fire treatments to accomplish hazard fuels reduction debris disposal may be implemented. Fuels management objectives may include, but are not limited to: maintaining natural processes, replicating natural fire, maintaining cultural and historic scenes, reducing hazard fuels, controlling non-native species, and preserving endangered species and habitat. Throughout the National Park Service, fuels management treatments are used to accomplish basic maintenance needs such as disposal of vegetation and debris.

Fuels management entails some risks that are minimized by the implementation of these policies and guidelines. Failure to prudently conduct fuels management projects may carry significantly greater risks and longer-term adverse ecological consequences than a fire management program that does not employ these activities.

II. AUTHORITIES

The fuels management program outlined in this chapter is authorized under Director's Order #18: Wildland Fire Management, Sections; 5.6: Prescribed Fire Operations, 5.7: Prescribed Burn Plans, 5.9: Fuels Management, and 5.10: Debris Disposal.

III. DEFINITIONS

Breakpoint – place or situation at which a grouping is divided.

Complexity – the degree or level of complication and difficulty associated with implementation of a prescribed fire.

Controls – actions taken to eliminate hazards or reduce their risk(s).

Debris Disposal - burning of natural vegetative debris deemed infeasible or impractical to mechanically remove in a non-wildland fuel environment (parking lot, boneyard, gravel pit, etc.). These may be generated from routine maintenance activities, piled debris generated from construction activities, removal of hazard trees, discarded building and administrative materials. Any material being burned for debris disposal must be classified as permissible to burn under applicable Federal, State, Tribal and Local regulations.

Exposure – the frequency and length of time subjected to hazard.

Hazard – any real or potential condition that can cause injury, illness, or death of personnel or damage to or loss of equipment or property.

Hazard Fuels - excessive live and/or dead wildland fuel accumulations (either natural or created) having the potential for the occurrence of uncharacteristically intense wildland fire.

Mitigation – actions taken to eliminate hazards or reduce their risk(s).

Pile Burning - burning of vegetative material that has been concentrated by manual or mechanical methods in a wildland fuels environment where fire may spread beyond the pile perimeter. A prescribed fire plan shall be written and approved prior to ignition for all pile burning.

Prescribed Fire - any fire ignited by management actions to meet specific objectives. The fuels to be burned are in either their natural or modified state under specified environmental conditions (e.g. weather and fuel moisture), confined to a predetermined area, and within a

range of fire intensity and rate of spread that permits attainment of planned management objectives and is conducted in conformance with an approved prescribed fire plan meeting National Environmental Policy Act (NEPA) and National Historical Preservation Act (NHPA) requirements prior to ignition.

Probability – the likelihood that an event will occur.

Residual risk – the risk remaining after mitigation and controls have been identified and selected. Mitigation and controls are identified and selected until the residual risk is at an acceptable level or until it cannot be practically reduced further.

Risk – chance of hazard or bad consequences; exposure to chance of injury or loss. Risk level is expressed in terms of hazard, probability and severity.

Risk assessment – the identification and assessment of hazards (first two steps of the risk-management process).

Risk decision – the decision to accept or not accept the risks associated with an action; made by the Superintendent, Division Chief, Fire Management Officer, Burn Boss, Leader or individual responsible for performing the action.

Risk Management – the process of identifying and controlling hazards to protect resources and property.

Severity – the expected consequence of an event in terms of degree of injury, property damage, or program impairment (workforce loss, adverse publicity, etc.) that could occur.

Wildland Fuels – combustible material that can be consumed by fire which includes naturally occurring live and dead vegetation, such as grass, leaves, ground litter, plants, shrubs, and trees, and excessive buildups of these materials resulting from resource management and other land use activities, as well as from natural plant growth and succession.

IV. PROGRAM REQUIREMENTS

- A. Fire Management Plan: Each unit intending to implement prescribed fire as part of a fuels management program must have an approved fire management plan authorizing and describing such activities (see Chapter 1 - Requirements and Chapter 4 - Fire Management Plans).
- B. Hazard Fuels Compliance: Programs to manage accumulations of hazard fuels must be the subject of an appropriate level of National Environmental Protection Act (NEPA) and National Historic Preservation Act (NHPA) cultural resource protection compliance. This compliance requirement may be met when hazard fuels management is identified as a

component in an approved Fire Management Plan, otherwise they must be identified in the park resource management plan and go through appropriate project compliance.

- C. Program Tracking: Fuels management projects shall be entered, approved, and funded using FIREPRO within the Shared Applications Computer System (SACS). Costs shall be identified and tracked for each project by phase and activity. See Chapter 18 (Fire Financial Programs).
- D. Risk Management: Each project shall follow a continuous risk management process (Exhibit 2). Risk management shall be a continuous process that identifies hazards, analyzes their pathways and impacts and prioritizes them; develops and carries out decisions for control, acceptance, or not to proceed; tracks hazards and implementation of control plans; supports informed, timely and effective decisions to control hazards; and assures hazard information is communicated and documented to all levels of the program. This process will be iterated throughout the life cycle (planning, preparation, execution, and evaluation) of the project.
- E. Monitoring: Monitoring must be done for every fuels management project to evaluate the degree to which objectives are accomplished. In addition to short-term monitoring to document the results of an activity, long-term monitoring may also be required. Permanent photo points, transects, or plots which are revisited in years following an activity will provide information on community and compositional trends, which result from the fuels management activity when combined with action thresholds. Monitoring is the basis of a successful adaptive management program. See Chapter 11 (Wildland and Prescribed Fire Monitoring) for additional information concerning monitoring techniques and frequencies.
- F. Regulatory: Fuels management activities shall comply with all applicable Federal, State, Tribal, and Local air and water quality regulations. See Chapter 14 (Air Quality and Smoke Management).
- G. Coordination, Collaboration and Communication: Each program shall establish and follow a mechanism for intra and interagency coordination, collaboration, and communication such that common understanding exists for the planning, preparation, execution, and evaluation of the fuels program. This common understanding will be defined in terms of a forum for raising and resolving issues, exchanging skills and resources, evaluating accomplishments and providing communication to federal agencies, state, local and tribal governments as well as local communities and interested parties in recognition that the implementation of a fuels program often crosses ownership boundaries.
- H. Project Evaluation: Each Park will develop an adaptive management process to evaluate their fuels management program. This program must consider analysis of short and long-term monitoring data, accomplishment of objectives, observed changes, operational

feedback, and program accountability. Results should direct review and revision of project objectives and adjustment to the program when necessary.

- I. Fuels Management Program Reviews: Annual unit level reviews will occur when fuels management activities have been undertaken in the previous year or are planned for current or future years. Regional and National level reviews will be conducted with normal FIREPRO program audits and reviews to ensure program consistency.

V. RESPONSIBILITIES

A. Agency Administrator

A park's Superintendent functions as the Agency Administrator on prescribed fire and retains the ultimate authority for approving all such fires. Responsibilities include:

1. Ensure that every wildland firefighter, fireline supervisor and fire manager takes positive action to obtain compliance with established standards and safe practices.
2. Ensure that the prescribed fire plan is closely linked to and consistent with the fire management plan and Agency direction and policy.
3. Ensure that all prescribed fires, non-fire treatments and debris disposal are conducted in accordance to established standards and guidelines.
4. Ensure that all escaped prescribed fires that result in resource or property damage are reviewed and investigated.

B. Resource Management Specialist

The Resource Management Specialist is responsible to the Agency Administrator for ensuring the fuels management program is planned and implemented in a manner supporting the park's resource management goals and objectives. Responsibilities include:

1. Ensures resource management representation in the preparation of the prescribed fire and non-fire treatment plan.
2. Ensure a Divisional review of prescribed fire plans is conducted before each plan is submitted for approval.
3. Evaluate fire use and non-fire treatment projects in terms of meeting objectives and operational efficiency.

C. Fire Management Officer

The Fire Management Officer (FMO) is responsible to the Agency Administrator for overall planning, implementing and monitoring of the fuels management program, in accordance with National Park Service policy and direction. Responsibilities include:

1. Ensure that activities and/or plans reflect a commitment to safety.
2. Assign a qualified Prescribed Fire Burn Boss, based on complexity, to all prescribed fires.
3. Develop written plans for the implementation of all prescribed fires, non-fire treatments undertaken or managed under the wildland fire program that are based on approved and in place land use and fire management plans.
4. Ensure that the Prescribed Fire Plans meets NPS policy and direction.

5. Ensure a technical/peer review of prescribed fire plans is conducted before each plan is submitted for approval.
6. Provide opportunities for training and performance evaluation in prescribed fire and non-fire treatment operations. Enter and maintain prescribed fire and non-fire treatment projects and employee qualifications in the Shared Applications Computer System (SACS).
7. Direct movement of local unit personnel and equipment to meet prescribed fire and non-fire treatment needs.
8. Assign personnel to prescribed fire and non-fire treatments according to qualifications and demonstrated ability.
9. Act as liaison/coordinator to the Prescribed Fire Burn Boss and/or Prescribed Fire Manager, local dispatch office, other NPS offices, other agencies, air quality authorities, news media, and safety officials.

D. Prescribed Fire Manager (RXM1/RXM2)

The Prescribed Fire Manager is responsible for implementing and coordinating assigned prescribed fire activities. A Prescribed Fire Manager may be assigned during periods when multiple, simultaneous prescribed fires are being conducted, multiple prescribed fires will be conducted within a short time frame or where there is complex interagency involvement. Responsibilities include:

1. Reviewing Prescribed Fire Plans prior to implementation and assessing the situation.
2. Ensuring that all operations are conducted in a safe manner and in accordance with the Prescribed Fire Plans.
3. Acting as coordinator/liaison between the burn organization(s) and other offices, agencies, air quality authorities, new media, transportation agencies, safety officials, and interested public.
4. Obtaining and interpreting long-term weather information.
5. Briefing Prescribed Fire Burn Bosses and directing operational assignments according to agency-specific policies, priorities and standards.
6. Setting priorities for allocation of resources.

E. Prescribed Fire Burn Boss (RXB1/RXB2)

The Prescribed Fire Burn Boss is responsible to the Agency Administrator or Prescribed Fire Manager for implementing the Prescribed Fire Plan. Responsibilities include:

1. Reviewing the prescribed fire burn plan prior to implementation and ensuring all requirements and objectives are addressed.
2. Reconnaissances of the burn unit to validate burn plan elements, including areas of special concern.
3. Obtaining current weather forecasts, updates and special advisors from a meteorologist.
4. Maintaining communication with the FMO and/or Agency Administrator.
5. Making the Prescribed Fire Operations Go/No-Go decision.
6. Ensuring that all operations are conducted in a safe manner and in accordance with the Prescribed Fire Plan.
7. Conducting the personnel/safety briefing to ensure a safe operation.

8. Conducting the test burn.
9. Supervising assigned personnel and directing the ignition, holding and monitoring operations.
10. Determining when the prescribed fire is not within prescription parameters or is not meeting objectives.
11. Managing the incident or overseeing the transition to another Incident Commander if an escape occurs.
12. Declaring the prescribed fire out.
13. Ensuring that reports are completed.

F. Technical Reviewer

The technical reviewer is responsible to the Fire Management Officer or Prescribed Fire Manager for reviewing each prescribed fire plan element for content and evaluating the risk and complexity analysis ensuring that the stated goals and objectives can be safely and successfully achieved when properly implemented. The technical reviewer shall be qualified or previously qualified at or above the level of project complexity. The technical reviewer should have local knowledge of the area, experience burning in similar fuel types, or conduct an on-site review. Individuals involved in the plan preparation cannot do the technical review. The technical reviewer shall be a qualified individual(s) independent of the preparation of the plan. It is recommended that they be from another park unit or an interagency cooperator or contractor. Responsibilities include:

1. Ensures that the Complexity Rating is appropriate for the planned project and the rationale supports the assigned rating.
2. Ensures that the Prescribed Fire Risk Analysis accurately represents the project and mitigation actions identified are appropriate.
3. Checks the prescription parameters against the fuel types to ensure that the project as planned has a reasonable chance of meeting the objectives stated.
4. Ensures that the fire behavior calculations are correct.
5. Ensures that the ignition and holding actions are consistent with the predicted fire behavior for the duration of the project.
6. Completes the Prescribed Fire Plan review checklist including comments and feedback as appropriate.

VI. PRESCRIBED FIRE

Each prescribed fire must have an approved prescribed fire plan before it may be implemented. Park specialists must review prescribed fire plans, particularly when clearances for the protection of cultural resources or threatened or endangered species are needed, air quality permits are required, or new programs are being implemented. All prescribed fire plans must be consistent with the direction given for prescribed fire in the fire management plan.

Technical review shall be completed for each prescribed fire plan to ensure elements of the plan and stated goals and objectives can be obtained and completed successfully. The superintendent is responsible for approving the prescribed fire plan.

All prescribed fire projects must be documented on a DI-1202, Individual Fire Report. The completed report must be input to the Shared Applications Computer System's (SACS) fire reporting program within 10 working days after the fire has been declared out.

A. Prescribed Fire Planning

The prescribed fire plan is the site-specific implementation document defining the strategic purpose, goals and objectives for the project. The prescribed fire plan provides guidance for developing an Incident Action Plan (IAP) defining tactical activities for each operational period needed to execute the prescribed fire project. A prescribed fire plan is required for each prescribed fire project. All prescribed fire plans must be reviewed and recommended by a burn boss qualified at or above the complexity level of the project. While the National Park Service has no specific position designated as a prescribed fire planner it is recognized that a burn boss possesses the skill and technical knowledge to perform this function. The minimum qualifications for the principal person preparing the plan must be a burn boss trainee (RXB2) and be knowledgeable of the local area and possess skills for writing the plan.

The agency administrator has final approval authority for the prescribed fire plan and shall ensure the plan receives sufficient oversight, guidance and support. As part of the responsibility for approval of the prescribed fire plan the agency administrator is responsible for ensuring that the prescribed fire plan is closely linked to and consistent with the fire management plan and Agency direction and policy.

The Burn Boss has the responsibility to make the on-site, operational, "go/no-go" decision and approval authority for the Incident Action Plan. The Burn Boss ensures that all prescription elements are met before, during, and after the burn. Deviations from the approved plan, which cause an escape, injury, property damage or other consequence, may result in personal liability. Any amendment that presents major changes to the outcome, size, fire effects, or potential impacts on the management organization of the burn shall go through the same review, approval, and notification process as the original plan. The Burn Boss can approve amendments addressing minor changes to specific implementation actions, defined in the Incident Action Plan (IAP), on the day of the burn. The prescribed fire planning process requires the completion of the following steps:

1. Technical Review: The technical review is REQUIRED to help ensure that a prescribed fire plan is written in a manner that the stated goals and objectives can be safely and successfully achieved when properly implemented.

2. Seasonal Severity: Effects of long-term drought are a component of the prescribed fire planning process and shall be factored into the prescription of each prescribed fire. When preparing the prescribed fire plan, consideration shall be given to long-term drought effects and climatological probabilities for weather events important to the success of the prescribed fire. When and where available national, geographic area, and specific long-term assessments will be evaluated. Consideration should be given to using long-range fire assessment teams, research, and agency meteorologists to support climatological assessments.
3. Collaborative planning and review: During the planning process all National Park Service units should solicit comments from all cooperating agencies and adjacent landowners, and attempt to incorporate those comments into the prescribed fire plan. However, mandatory approval from these agencies and landowners should not be required because it would curtail meaningful progress in accomplishing fuels management objectives.
4. Prescribed Fire Project Plan Contents: A standard prescribed fire plan form has been developed for use in the National Park Service. However, due to the variety of information required by an individual park unit the plan may be supplemented with additional content provided the minimum elements listed in the standard form are addressed. Each plan **shall include** as a minimum, the following elements:
 - a. Signature Page: The approved prescribed fire plan constitutes a delegation of authority to burn. No one has the authority to burn without an approved plan or in a manner not in compliance with the approved plan. Actions taken in compliance with the approved prescribed fire plan will be fully supported. Personnel will be held accountable for actions taken that are not in compliance with elements of the approved plan regarding execution in a safe and cost-effective manner.
 - b. Executive Summary: A brief discussion describing the purpose and justification of the project, connection with the overall management of the unit, and description of how it implements the fire management plan.
 - c. Description of Prescribed Fire Area:
 - 1) General Area Description (narrative)
 - 2) Location (County, Legal, Lat/Long and/or UTM, Fire Management Zone)
 - 3) Geographic Attributes (Project Size, Elevation Range, Slope Range, Aspect Range)
 - 4) Description of Project Boundaries (Define geographic, natural and human features to be used as the project boundary.)
 - 5) Vegetation Types: Described the structure and composition of the vegetation type(s) within the project area, the percent of the area composed of this type and the fuel model that corresponds to it. Include plant community class, as available.

- 6) **Fuels Characteristics:** Described fuels as applicable by fuel type. Describe: Fuel type, natural or activity; Fuel Loadings by size class, live and dead, and total; Fuel bed depth; Arrangement; and discussion of past environmental effects on the land and how they have impacted the fuel characteristics as appropriate.
 - 7) **Vicinity Maps** – attached as appendices
 - 8) **Project Maps** – attached as appendices (include vegetation/fuel maps)
- d. **Goals and Objectives:** Include purpose and goals of the prescribed fire, as stated in park management and supporting management plans (i.e. Resource Management Plan, Cultural Landscape Plan, Endangered Species Recovery Plan, etc.) Specific objectives of the prescribed fire and protection objectives shall be stated in quantifiable and measurable terms.
- e. **Risk Management:** The process of identifying and controlling hazards to protect resources and property. This includes implementing a risk management process, which is an analysis of proposed actions, the environment (fuels, topography, weather, etc.) where the project takes place, assessment of hazards, potential consequences, and mitigation to reduce risk (see Exhibit 2, Hazard Rating Guide; Exhibit 3, Prescribed Fire Risk Analysis Worksheet; and Exhibit 4, Risk – Assessment Matrix). Mitigations to reduce risk are outlined in the Prescribed Fire Risk Mitigation Table, Exhibit 5. The mitigations described are then addressed in the later sections of the prescribed fire plan dealing with project complexity, organization, pre-burn considerations, ignition and holding actions, public and firefighter safety, and monitoring.
- A Job Hazard Analysis (JHA), Exhibit 14, is part of this procedure and helps to integrate acceptable safety and health principles into the operation within the Humans Factors element of the Prescribed Fire Risk Analysis Worksheet (Exhibit 3).
- f. **Project Complexity:** A prescribed fire complexity rating shall be completed as part of each prescribed fire plan following the process in Exhibits 6 and 7 (Exhibit 6, Prescribed Fire Complexity Rating Worksheet and Exhibit 7, Complexity Value Guide). This process determines the level of organizational structure and support needed to implement the project based on operational, logistical, safety and management needs. The complexity value breakpoints for requiring a Prescribed Fire Burn Boss Type 1 shall be 4 or more Complexity Values rated “High” OR 2 or more of the Primary Factor Complexity Values rated “High” OR when deemed appropriate by the agency administrator or unit Fire Management Officer.
- g. **Organization:** List required project organization to complete all phases of the project execution. The prescribed fire organization should be developed based on the objectives, risk assessment and project complexity. Specify **minimum**

number and type of resources needed. Consider long duration, day/night, and multi-operational period projects where exchange of resources will need to occur.

- h. Cost: Estimated total costs for all phases of the project.
- i. Scheduling: Include proposed ignition date, projected duration. Note any dates when project may not be conducted.
- j. Preburn Considerations: List key on and offsite preburn activities and special precautions and regulations including responsibilities and timeframes. Specify on-site: line to be built, snags to be felled or protected, equipment to be pre-positioned, special features to be protected, warning signs to be placed, weather recording and monitoring needs, etc. Specify off-site: burn permits, notifications, media releases, closures, etc. Notifications will show whom we want to contact, who was contacted, who made the contact and when the contact was made. Specify special precautions and regulations: air quality, endangered species, cultural clearances, etc.
- k. Prescription: A prescribed fire prescription contains key weather and fire behavior parameters needed to achieve desired results. Identify ranges of acceptable prescription parameters to obtain desired fire behavior and effects. Attach modeling outputs to justify prescription.
- l. Ignition and Holding Actions: Identify methods, roles and responsibilities, coordination and special considerations needed. Attach modeling outputs or worksheets (i.e. Fireline Handbook, BEHAVE, etc.) to justify minimum holding resources required. An Incident Action Plan (IAP) is developed for each operational period that defines tactical activities and assignments.
 - 1) Test Fire: The test fire is intended to evaluate fire behavior characteristics that are necessary to meet the prescribed fire plan objectives. A test fire is completed prior to making the decision to execute the project. It shall be ignited at a location within the prescribed fire area that is representative of the site and in an area that can be easily controlled if fire behavior is unacceptable.
 - 2) Firing and Ignition: Describe ignition operations including firing techniques and patterns. (attach a map where applicable.) Firing and ignition patterns should address potential changes to weather, topography and fuels. Specific firing and ignition tactics will be documented in the IAP showing necessary resources, safety considerations, equipment, and supplies. These tactics shall be further clarified in the briefing.
 - 3) Holding Actions: Operations to safely maintain the prescribed fire within prescription, within project boundaries and control all slopovers and spot fires within a predetermined time and size. Consider long duration, day/night, multi-operational period projects where exchange of resources will need to occur.

- 4) Critical Holding Areas: Identify those areas where there is a higher likelihood of holding problems along the boundary or outside the burn unit (anticipated locations of numerous spot fires and/or slopovers, changes in fuel type, high value resource near the project boundary, etc.).
 - 5) Divide the Project Area into subunits such as Branches, Divisions, and Groups, based upon complexity, size, assignments, access, topography, etc. Clearly delineate these on the project map using Incident Command System (ICS) symbols.
 - 6) Mop-up Operations: Identify proposed actions to secure and patrol project area until the prescribed fire is declared out.
- m. Wildland Fire Transition Plan: Identify actions and notifications needed when the prescribed fire exceeds project boundaries and cannot be controlled within one burning period using on-site holding resources. All further actions will be determined through a new strategy developed in the Wildland Fire Situation Analysis (WFSA) process. Identify who the initial incident commander will be and what notifications will be needed.
- n. Protection of Sensitive Features: Identify treatment and mitigations needed to protect cultural sites, threatened and endangered species, or other sensitive features. Include compliance with all applicable NEPA and NHPA requirements.
- o. Public and Firefighter Safety: Describe public and personnel safety and emergency procedures. Identify safety hazards in and outside the project area, measures taken to reduce or mitigate those hazards, and Emergency Medical Service personnel assigned. The IAP should address communications, medical plan, and incident safety analysis.
- p. Smoke Management: Describe how the project will comply with County, State, Tribal, and Federal air quality regulations. Include modeling outputs and mitigation measures to reduce potential impacts of smoke production and smoke related safety and health issues, if required.
- q. Interagency Coordination and Public Information: Identify actions, timelines and responsibilities for interagency and intra-agency pre-burn coordination and public involvement.
- 1) Media Releases and Public Notice Postings.
 - 2) Notifications: List of appropriate individuals, agencies and the public to receive notifications.
- r. Monitoring: Describe how the following two elements will be met:
- 1) Fire Behavior Monitoring – specify how monitoring of prescription elements will take place pre-ignition and during the burn, including weather, smoke/air quality, and fire behavior observations. Specify on-site weather, smoke, and fire behavior observations required during all phases of the project. Include

procedures and responsibilities for acquiring weather and smoke forecasts. May reference park Fire Monitoring Plan, or recommended standards for Level 1 and/or Level 2 fire monitoring guidelines in the NPS Fire Monitoring Handbook.

- 2) Fire Effects Monitoring – specify how long and short-term fire effects (vegetation and fuels) monitoring will take place pre-burn and post-burn to evaluate if project objectives have been met. May reference park Fire Monitoring Plan, or recommended standards for Level 3 and/or Level 4 fire monitoring guidelines in the NPS Fire Monitoring Handbook. If plots exist on the unit, include a map of plot locations.

Chapter 11 contains an outline for completing a Fire Monitoring Plan.

- s. Post Fire Rehabilitation: Describe any necessary rehabilitation of disturbances that will be undertaken resulting from management activities of the project. These typically include fireline restoration, minor fence repairs and other mitigation actions that are pre-identified in the prescribed fire plan.
- t. Post Fire Reports: Identify who, what and when various reports associated with this project will be completed.
- u. Appendices: Items to be attached to the prescribed fire plan:
 - 1) Reviewer Comments - Provides a space for each reviewer to document comments pertaining to the development of the prescribed fire plan.
 - 2) Technical Reviewer Checklist and Comments
 - 3) Maps
 - 4) Prescribed Fire Complexity Rating Worksheet
 - 5) Fire Modeling Outputs
 - 6) Agency Administrator Go/No-Go Pre-Ignition Approval
 - 7) Prescribed Fire Operations Go/No-Go Checklist

B. Prescribed Fire Operations

1. Qualifications: A certified Prescribed Fire Burn Boss (RXB2, RXB1) must implement all prescribed fires. The prescribed fire burn boss type will be determined by using the Prescribed Fire Complexity Rating Guide and consensus between the fire management officer and the park superintendent. NPS Burn Bosses will be certified with task books to conduct prescribed fires in specific fuel types and complexity.

The Burn Boss on a NPS project may be from another agency, so long as he/she is a certified burn boss by that agency in that fuel type which the park wants to burn. Additionally, all positions assigned to prescribed fires will meet all national requirements for training and experience, as described in Chapter 6, Training, Qualifications, and Certification.

2. Prescription: Prior to ignition, compare prescription elements, both individually and collectively, against localized weather forecasts, other predicted conditions and test fire observations. A localized weather forecast is required prior to implementing the prescribed fire. It is recommended that a spot weather forecast be obtained when needed and where possible. The same level of authority required for plan approval must approve any changes to prescriptive parameters.
3. Go/No-Go: Two Go/No-Go checklists, one for the Agency Administrator (Exhibit 8) and another for the Prescribed Fire Burn Boss (Exhibit 9), shall be completed and documented (signed) prior to executing a prescribed fire.

The Agency Administrator's Go/No-Go Approval is the final management approval prior to execution of the prescribed fire and evaluates whether compliance requirements, prescribed fire plan elements, and internal and external notifications have been completed. The Agency Administrator's Go/No-Go Approval is only for initial execution of the prescribed fire and is valid for up to 30 days after approved date. If ignition of the prescribed fire is not initiated prior to expiration of the Agency Administrator approval a new one will be completed.

The Prescribed Fire Operations Go/No-Go checklist is a final operational confirmation that all requirements of the prescribed fire plan have been met and conditions are appropriate for initiation of the prescribed fire (i.e. do we commence with firing or not?). This checklist shall be used as daily validation until ignition is completed and there are no existing or eminent threats to the fireline (i.e. project boundary).

4. Test Fire: The purpose of a test fire is to observe, evaluate, and monitor fire behavior and subsequent effects, compare observations with predictions, objectives, and the Burn Boss' ability to manage the prescribed fire, and to determine if the fire meets prescription parameters. A test fire must be completed prior to making a decision to execute the project. It shall be ignited at a location within the prescribed fire area that is representative of the site and can be easily controlled if fire behavior is unacceptable. If results of the test fire are unacceptable, the test fire will be terminated, the prescription reevaluated, and the prescribed fire postponed and/or rescheduled.

On multiple-day projects, evaluation of current fire behavior may provide a comparative basis for continuing ignitions. When in doubt, initiate a separate test fire and evaluate results.

5. Aerial Operations: All applicable planning and procedures outlined in Director's Order/Reference Manual 60 (DO/RM 60) and the Aerial Ignition Guide will be addressed.
6. Ignition and Holding Actions: Activities needed to safely maintain the prescribed fire within prescription, within project boundaries and control all slopovers and spot fires

within one burning period using on-site resources. Span of control must be considered in defining overhead positions to manage the tactical implementation. Holding activities include firing, line construction, line holding, patrol and mop-up procedures as necessary. Determination of the minimum type, number, and response time of holding resources must be justified using some modeling tool(s) and production rate tables (Behave, Farsite, Fireline Handbook, Holding Worksheet.) Holding resources must be ordered and committed. If holding resources are staged off-site, response times must be sufficient to support all identified holding actions (for example, a helicopter with bucket at a helispot must be able to be on-site within a predefined amount of time). Additional resources may be ordered during the execution phase of the project to supplement on-site resources provided the prescribed fire is within project boundaries and within prescription. Consider logistics of long duration, day/night, multi-operational period projects where exchange of resources will need to occur.

An Incident Action Plan (IAP) shall be developed for each operational period defining tactical activities and assignments for the project execution phase based on the prescribed fire plan. Branches, Divisions, and/or Groups shall be identified and assigned based on complexity, size, tasks, access, topography, etc.

If prescription parameters are exceeded during project execution, ignition operations should be terminated by the Burn Boss at a safe and appropriate location based on fire behavior, fuels, topography and weather conditions. If the project area comes back into prescription based on current and forecasted weather, ignition operations may continue. If not, the project area is put into a mop-up or patrol status. Holding actions shall maintain control of the fire until a decision to continue, postpone or extinguish the prescribed fire is made and the Agency Administrator or their designee is notified. This decision making process shall be articulated in the prescribed fire plan.

If the prescribed fire exceeds project boundaries and/or slopovers and spot fires are not contained within one burning period, suppression actions will be taken and the entire prescribed fire project will be declared a wildland fire.

If at any time the prescribed fire poses significant threats to life, property, or high value resources, beyond those mitigated in the plan, suppression actions will be taken and the fire will be declared a wildland fire.

Once the prescribed fire is declared a wildland fire all subsequent actions (i.e. operational needs, notifications, strategies, resource orders, etc.) will be defined under a wildland fire transition plan, which is part of the prescribed fire plan until an initial Wildland Fire Situation Analysis (WFSA) is completed.

7. Monitoring Identify whom and how the fire behavior monitoring will take place during the burn, including on-site weather, smoke/air quality, and fire behavior observations.

Include communication procedures and responsibilities for acquiring and disseminating weather and smoke forecasts and pertinent field observations.

8. Wildland Fire Transition Plan: Identify actions needed once the prescribed fire is declared a wildland fire. Identify who the initial incident commander will be and what notifications will be needed. All further actions will be determined through a new strategy developed in the Wildland Fire Situation Analysis (WFSA) process.

C. Prescribed Fire Documentation Requirements

All prescribed fires will be documented with the following information, stored in an individual fire folder and maintained in the park's files. Individual parks may require additional information.

1. Original Signed Prescribed Fire Plan
2. Checklist of Pre-Burn Prescribed Fire Activities (no specific form)
3. All Reviewer Comments
4. All Maps
5. Notification Checklist
6. Permits such as burn, smoke, etc.
7. Monitoring data
8. Weather forecasts
9. Agency Administrator Go/No-Go Pre-Ignition Approval
10. Operational Go/No-Go Checklist
11. Incident Action Plan(s)
12. Unit logs, Daily Validation or other unit leader documentation
13. Press Releases, Public Comments, and Complaints
14. Smoke dispersal information
15. Post fire analysis
16. Fire Occurrence (DI-1202) report (Must also be reported in SACS)

VII. NON-FIRE TREATMENT

As an alternative to, or a complement to prescribed fire applications to minimize the probability and effects of large-scale, high intensity fires, a variety of non-fire techniques that include, but are not limited to, mechanical, chemical, biological, and manual methods, and combinations of multiple techniques can be utilized.

Non-fire treatment to manage hazard fuels is a planned activity that must go through the NEPA process. This may be accomplished as part of the park's Fire Management Plan or a separate Hazard Fuel Plan or through project level NEPA for each proposed non-fire treatment project.

A. Non-fire treatment Planning:

Specific fuel treatments include vegetation manipulation and/or removal or modification of wildland fuels to reduce the likelihood of ignition, reduce potential fire intensity, lessen potential damage and resistance to control, or limit the spread and proliferation of invasive species and diseases. These treatments achieve site-specific management objectives under an approved fire management plan or other vegetation management plan having full compliance with NEPA, NHPA and other laws and statutes.

1. Facilities and Construction: All NPS design and construction projects will consider wildland fire prevention, protection capability and mitigation measures to reduce potential for adverse impacts of wildland fire.
2. Wildland/Urban Interface: NPS units shall consider potential risks from wildland fires to communities both within and adjacent to their boundaries. When possible, parks should minimize that risk through an active wildland/urban interface program including fuels treatment, property owner education and community involvement. This program may have involvement by other agencies and fire protection units to meet interagency requirements.
3. Non-fire treatment Plan: This program activity must be documented in a written plan approved by the park superintendent and be in compliance with NEPA and NHPA and other legal requirements. Planning for non-fire treatment requires problem identification, goal setting, information collection, alternative analysis, action implementation, and evaluation of results. The Non-fire treatment Plan is to be approved by the park superintendent and attached as an appendix to the Resource Management Plan, Vegetation Management Plan or Fire Management Plan.

Plans will vary in complexity from park to park, but all plans should include, at a minimum the following key elements (see NPS-77: Resource Management; Vegetation Management Section):

- a. Introduction, including the park's objective for non-fire treatment and issues definition;
- b. A synopsis or complete text of the non-fire treatment assessment;
- c. Management alternatives for meeting stated objectives and issues, including identification of specific management treatments, preferred alternatives, benefits and drawbacks, and annual goals;
- d. A review of existing research findings and identification of research needs;
- e. A plan for long-term monitoring, including quantitative standards against which success in achieving the park's objectives can be measured;
- f. A strategy for achieving compliance with NEPA, the Endangered Species Act, and other compliance requirements;
- g. An outline of interpretive and public involvement actions; and
- h. Assignment of roles and responsibilities.

4. Non-fire treatment Project Plan: The Non-fire treatment Project Plan should describe the fuel hazard, the values to be protected, the proposed mitigation action(s) with specifications of work to be done and a breakdown of costs associated with mitigation. Proposed treatment methods can include fire and non-fire techniques. These plans must include the following minimum elements:
 - a. Signature Page: The approved Non-fire treatment Project Plan constitutes a delegation of authority to implement the plan. Actions taken in compliance with the approved Non-fire treatment Project Plan will be fully supported. Personnel will be held accountable for actions taken that are not in compliance with elements of the approved plan regarding execution in a safe and cost-effective manner.
 - b. Executive Summary: A brief discussion describing the purpose and justification of project, connection with the overall management of the unit, and description of how it implements the fire management plan.
 - c. Description of Fuels Treatment Area
 - 1) General Area Description (narrative)
 - 2) Location (County, Legal, Lat/Long and/or UTM, Fire Management Zone)
 - 3) Geographic Attributes (Project Size, Elevation Range, Slope Range, Aspect Range)
 - 4) Description of Project Boundaries (Define geographic, natural and human features to be used as the project boundary)
 - 5) Vegetation Types: (Fuel Models, Fuel Loading)
 - 6) Vicinity Maps – attached as appendices
 - 7) Project Maps – attached as appendices
 - d. Goals and Objectives: Include purpose and goals of the non-fire treatment plan, as stated in park management and supporting management plans (i.e. Resource Management Plan, Cultural Landscape Plan, Endangered Species Recovery Plan, etc.) Specific objectives of the non-fire treatment should be stated in quantifiable and measurable terms.
 - e. Cost: Estimated total costs for all phases of the project.
 - f. Statement of Work: Identify methods, roles and responsibilities, coordination and special considerations needed.
 - g. Protection of Sensitive Features: Identify treatment and mitigations needed to protect cultural sites, threatened and endangered species, or other sensitive features. Include compliance with all applicable NEPA and NHPA requirements.
 - h. Public and Personnel Safety: Describe public and personnel safety and emergency procedures. Identify safety hazards on and outside the project area,

measures taken to reduce or mitigate those hazards, and Emergency Medical Service personnel assigned.

- i. Interagency Coordination and Public Information: Identify actions, timelines and responsibilities for interagency and intra-agency pre-burn coordination and public involvement.
 - 1) Media Releases and Public Notice Postings
 - 2) Notifications - List of appropriate individuals, agencies and the public to receive notifications.
- j. Monitoring: Describe the pre-, during, and post-treatment monitoring needed to evaluate if project objectives have been met and if project is being conducted within prescription. Specify elements (may include weather, vegetation, soil, and air quality observations) required during each phase of the project including procedures and responsibilities. May reference park Fire Monitoring Plan if applicable.
- k. Post Project Rehabilitation: Describe any necessary rehabilitation of disturbances that will be undertaken resulting from management activities of the project. These typically include equipment and human travel corridor restoration, minor fence repairs and other mitigation actions that are pre-identified in the Non-fire treatment project plan.
- l. Post Project Reports: Identify who, what and when various reports associated with this project will be completed.
- m. Appendices: Items to be reviewed/signed and attached with the Non-fire treatment plan.
 - 1) Maps
 - 2) Reviewer Comments

B. Non-fire treatment Operations:

- 1. Qualifications: An ability to perform based on past performance or the ability to fulfill contract specifications.
- 2. Treatment Methods: Specific fuels treatments include any vegetation manipulation and/or removal or modification of wildland fuels to reduce the likelihood of ignition, reduce potential fire intensity, lessen potential damage and resistance to control, or limit the spread and proliferation of non-native species and diseases. Each of the treatment options have merit and have been applied somewhere in the National Park Service but each represents unique compliance concerns as well as general resource management issues. These should always be coordinated with Natural

Resource Managers. These treatments, a variety of fire and non-fire techniques, or combination thereof, include but are not limited to:

- a. Manual: the use of hand-operated power tools and hand tools to cut, clear or prune herbaceous and woody species. Plants are cut above ground level to remove undesired vegetation or root systems are dug out to prevent subsequent sprouting and regrowth. Hand tools such as the handsaw, axe, shovel, rake, machete, and hand clippers are used in manual treatments. Power tools such as chainsaws, power brush saws may also be used. Manual treatments may be considered stand-alone treatments or be followed by chemical treatment, or burning of debris piles or prescribed burning of the treatment site. In some cases of manual removal of woody species, stumps are "painted" with herbicide to prevent sprouting.
- b. Mechanical: Mechanical treatment is the removal of undesired or excess live and dead fuels through the use of wheeled tractors and crawler-type tractors or specially designed vehicles with attached implements, e.g. saw heads, excavators, and disks and blades. Mechanical treatment proposals should be carefully reviewed in context of soil/litter disturbance. In many cases, after years of fire suppression it may be desirable to require placement of controls to limit erosion into streams. Mechanically treated material may be left on site or physically removed from the site. Mechanical treatments may be considered stand-alone treatments or be followed by burning of debris piles or prescribed burning of the treatment site. Any equipment brought in from a distance should be inspected, and as necessary, washed and cleaned of any seeds (found in wheels, etc.)
- c. Chemical: the application of chemical agents to alter existing fuels. Chemical agents are applied to kill or restrict the growth of existing vegetation. This type of treatment is predominantly used to reduce the distribution of non-native and invasive species. Chemical treatments may proceed or be followed by another treatment type such as prescribed burning or mechanical treatment and/or planting of desired vegetation species depending on the response of the system.
- d. Biological: the use of living organisms to selectively suppress, inhibit, or remove herbaceous and woody vegetation. This must include planning for vacating/fasting and eventual removal, as well as threats to T&E species. That is, animals should not be a source of non-native inocula (seeds, spores, etc.) via what they might carry on/in hooves, coats and intestines. Plant eating organisms include insects as well as grazing animals such as goats and sheep.

3. Project Administration

- a. In-house: Utilizing in-house (park, agency, or cooperator) workforce under existing agreements and cost sharing.
- b. Contracting: Utilizing outside (vendor, contract, etc.) acquired personnel, equipment and end product specifications to achieve project objectives.

C. Non-fire treatment Project Documentation Requirement: All hazard fuel projects will be documented with the following information and stored in an individual project folder and maintained in the park's files. Individual parks may require additional information.

1. Original Signed Project Plan
2. All Maps
3. Notification Checklist
4. Permits
5. Monitoring data
6. Unit logs or other unit leader documentation
7. Contracts

VIII. DEBRIS DISPOSAL

Fire may be used to dispose of wildland fuels generated from maintenance activities (such as grass or brush mowing or clippings), hazard tree removal, or during construction activities. These materials must be deemed infeasible or impractical to mechanically remove and must be in a non-wildland fuel environment (parking lot, boneyard, gravel pit, etc.) Where permitted specifically by local regulations, discarded building and administrative materials can also be burned. All such activities and all new debris burning projects will be reviewed by a fire management officer, or appointed staff person, having wildland fire knowledge, in areas without a fire management officer.

If, after consultation with the fire management officer, it is determined that a debris disposal burn will meet all of the following conditions then it may be conducted within debris disposal guidelines.

1. Has virtually no chance to exceed the perimeter of the non-wildland environment.
2. Will not damage surrounding natural or cultural resources.
3. Does not present a safety threat to crew members.
4. Will not require curtailment during the burning operation.
5. Will not require a prescribed fire burn boss or fire-qualified personnel to implement.
6. Requires no follow-up monitoring to evaluate environmental impacts.

Otherwise, it will constitute a prescribed fire and must comply with all requirements for that type of activity.

For debris burns, all personnel will wear appropriate personal protective equipment. The supervisor of the burn will notify appropriate agencies (air quality, local fire departments, etc.) and neighbors and obtain all needed permits, and will develop an appropriate safety and evacuation plan in case of injuries or other emergencies. The crew should include someone who has previously conducted a similar burn at the site or a similar site.

Contracts involving the generation or disposal of such fuels should be developed and conducted in coordination and consultation with the local, or the closest available, fire

management officer. All construction contracts/projects producing vegetative debris should specify when and how the material would be disposed. If fire is a potential disposal method, the park or regional fire management officer should review and approve contract stipulations related to debris burning. Costs associated with the debris burning should be included in the contract/project budget.

In an effort to clarify what is reportable as a type 48, prescribed fire, on the DI-1202, the following guidance is offered. If burning of debris does NOT require preparation of a prescribed fire plan that meets guidance given in this document, the burn should NOT be reported as a prescribed fire.

The following examples are offered:

1. Maintenance clears the roadside of brush. The resulting debris is hauled to a "boneyard" where it is burned in compliance with state air quality regulations. No resource objectives are met and no prescribed fire plan is done. No DI-1202 report is required.
2. An inholder burns a series of debris piles that they have collected during a hazard fuel cleanup of the inholder's property. The burn is done without a prescribed fire plan and does not involve Service personnel other than the occasional visit. No DI-1202 report is required.
3. Maintenance burns a series of ditch banks. The burn is conducted according to a prescribed fire plan. Reported on a DI-1202.
4. Debris resulting from a construction project is burned according to a contract. The burning of construction debris is prohibited under many state air quality regulations. No DI-1202 report is required, unless a prescribed fire plan is prepared stating resource objectives.
5. A number of piles are burned according to a prescribed fire plan. In this instance, the area occupied by the piles does not represent the total treated acres, the total area cut and piled is the treated area and a DI-1202 report will be completed. For example, if a 10 acre hazard fuel area is treated (thinning and/or clearing) and resultant two (2) acres of piled debris is burned, the reportable treated acres would be 10 acres.

All debris disposal projects must be evaluated in terms of alternative treatments. Alternative treatments to burning may be possible, and desirable in terms of smoke management and visibility concerns.

RISK MANAGEMENT PROCESS

The risk management process was developed to assist the user in determining relative risk and complexity of any prescribed fire project. The process provides the local prescribed fire manager with a system to include local considerations and risks in the decision process. The process incorporates materials from other agencies' prescribed fire guides to facilitate the National Park Service and interagency understanding and application of the process.

The purpose of the risk management process is to:

- Identify, analyze and mitigate specific hazards to reduce the risk of an unfavorable outcome for a prescribed fire.
- Aid the decision making process for planning and implementing a prescribed fire by focusing on the evaluation of common elements that contribute to the level of difficulty for implementing a prescribed fire.
- Facilitate the planning process to identify the prescribed fire positions and skill levels necessary to safely and successfully complete a prescribed fire.
- Set the risk policy (accept, control, not to proceed with the project).

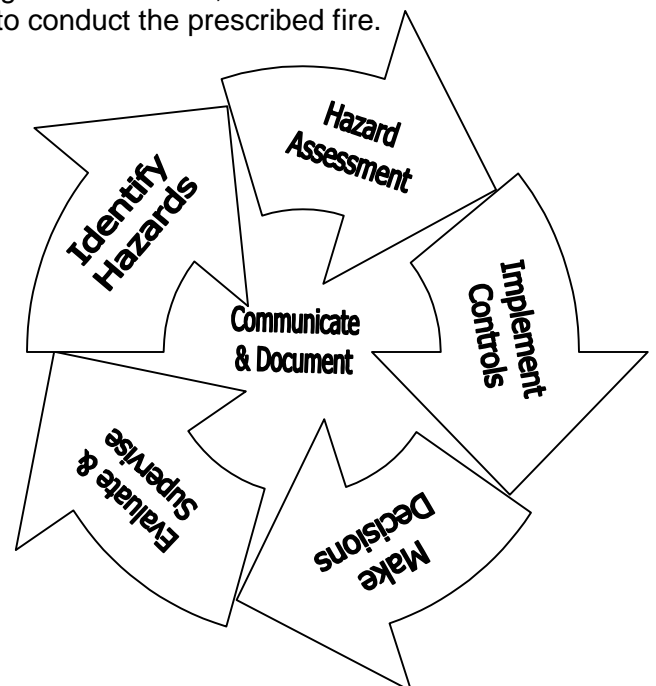
The process considers three functions that are interrelated:

- A. Risk - the probability or likelihood that an event or situation will occur with its potential consequence, some measure of the cost or result of an event or situation occurring;
- B. Mitigation - the activities or procedures to be completed to reduce risk for a safe and successful implementation of a prescribed fire; and
- C. Complexity – degree or level of complication and difficulty associated with implementation of a prescribed fire and is used to indicate organizational structure and skills needed to deal with the prescribed fire and the consequences.

The process determines levels of risk, describes mitigations activities, and it defines the minimum level of prescribed fire burn boss required to conduct the prescribed fire.

The process makes risk management responsive to all organizational levels and provides for communication between management and the individual worker in the field.

For maximum effectiveness the risk management process must be a closed-loop; five-step cyclic process (see figure to the right). It must be incorporated in the initial project planning and continue through execution, evaluation, and after action reviews. This process is applicable to any situation and environment. Its five steps represent a logical thought process from which users develop tools, techniques, and procedures for applying risk management to their areas of responsibility.



Risk Management Functions

Identify hazards: Identify hazards to the persons doing the work or hazards that could prevent the project from having a successful outcome. Consider all aspects of current and future situations, the environment and known historical problem areas. For fuels management the hazard elements are categorized in four areas: environmental factors, agency values, public values and human factors. When identifying the hazards it is important to state the hazard in terms of condition and consequence(s); and capture the context of the hazard; e.g., what, when, where, how, and why. Those working on the project must also understand the constraints placed on the project by previous planning through the resource management plan and fire management plan. This part of the process is often referred to as “situation awareness”.

Hazard Assessment: Assess hazards to determine risks. Assess the impact of each hazard in terms of potential loss and cost based on probability, and severity. Utilize hazard data from previous projects, expert opinion, Look Up/Down/Around Indicators, Watch Outs, Urban /Wildland Watch Outs, lessons learned, and previous experience. Evaluate the hazard relative to timeframe (when actions need to be taken); group with similar/related hazards; and prioritize.

Implement Controls: Develop control measures that eliminate the hazard or reduce its risk through a process of mitigation. Utilize additional resources or increase resource capability, Lookouts, Communications, Escape Routes, and Safety Zones (LCES) checklist, and downhill line construction checklist to reduce probabilities or mitigate potential consequences. As mitigation measures are developed, hazards are reevaluated until all risks are reduced to a level where benefits outweigh potential consequences. Develop and document risk acceptance rationale and show levels of acceptable residual risk.

Make Decisions: Decide how to proceed: accept the level of risk, invoke further mitigation and controls, continue tracking and proceed, or do not proceed with the activity. Clearly communicate your decision to those who assigned you the task and those working for you performing the task.

Evaluate/Supervise: Evaluate the effectiveness of mitigations and controls and adjust or update as necessary to ensure effectiveness. Enforce standards and controls.

Communicate & Document: These elements are present in all of the preceding functions and are essential for the management of risks. A system for documentation and tracking of risk decisions shall be implemented through all five functions using the worksheets and forms included in Exhibit 1 and unit log(s) kept during the implementation phase.

Remember risk management is a tool to help make sound decisions in a logical manner. Risk assessment is a process to identify and assess hazards and monitor changes to those hazards over time.

To be successful we need to apply the five rules of risk management:

1. Accept that every thing we do involves risk.

2. Integrate the risk management process into planning that identifies hazards and controls early and continues to be assessed as the plan develops.
3. Accept no unnecessary risks but rely on calculated risk to govern all actions.
4. Make risk decisions at the proper level and accept changes and feedback for inclusion in the risk management process.
5. Agree to accept risk only if benefits outweigh potential losses.

Risk Management Process Instructions:

Step #1: The local unit must establish the breakpoints relevant to their situation for Low, Moderate, and High hazard probability and potential consequences. This is done by completing the Hazard Rating Guide (Exhibit 2) or listing them in a narrative document. In either case the local unit must complete a brief narrative for each level (Low, Moderate, and High) of the Hazard Probability and Potential Consequences for all the hazard elements. This should be done cooperatively with interagency partners to assure an understanding of the process and the breakpoint definitions. When completed, attach to the Prescribed Fire Risk Analysis Worksheet (Exhibit 3).

Step #2: Complete the Prescribed Fire Risk Analysis Worksheet (Exhibit 3) by identifying the hazard elements that are present in and around the proposed prescribed fire project.

Step #3: For each appropriate hazard element determine the hazard probability and potential consequence. Be sure to document the rationale of the selection.

Step #4: Determine risk using the Risk – Assessment Matrix (Exhibit 4) by finding the intersection between the hazard probability and the potential consequence and entering the value as the risk for that element in the Prescribed Fire Risk Analysis Worksheet (Exhibit 3).

Step #5: Transfer the risk rating values from the Prescribed Fire Risk Analysis Worksheet (Exhibit 3) to the Prescribed Fire Risk Mitigation Table (Exhibit 5), listing them in the Risk column.

Step #6: Describe briefly an appropriate mitigation measure for each hazard element of the Prescribed Fire Risk Mitigation Table (Exhibit 5), having a Moderate or High risk value.

Step #7: Identify residual risk on the Prescribed Fire Risk Mitigation Table (Exhibit 5), by repeating Steps 3 and 4 for each hazard element having a mitigation measure.

Step #8: On the Prescribed Fire Risk Mitigation Table (Exhibit 5), list by section and subsection of the prescribed fire plan, where the mitigation measures are addressed. These sections in the Prescribed Fire Plan must describe where, when, and how the mitigation measures will be implemented.

Step #9: The risk value from each of the hazard elements where mitigation will be done, and residual risk is present, are to be considered when developing the Prescribed Fire Complexity Rating Worksheet (Exhibit 6).

NOTE: If unnecessarily high risk cannot be mitigated or removed, the analysis may be stopped at this point and the results used to revise or alter the prescribed fire plan objectives and desired effects.

Prescribed Fire Complexity Rating Worksheet Instructions:

Residual risk represents the level of risk unaccounted for with mitigation and can provide a major influence on the implementation of the prescribed fire. Residual risk must be considered when selecting complexity values in the Complexity Value Guide (Exhibit 7).

Step #1: Use the Complexity Value Guide (Exhibit 7) to select the appropriate complexity value for each complexity element. These values are checked in the appropriate column on the Prescribed Fire Complexity Rating Worksheet (Exhibit 6).

Step #2: Subtotal the count of primary and secondary factors.

Step #3: Add the subtotals and record as the total count at the bottom of the worksheet.

Step #4: Follow the guidance in the Qualification Determination Table to select the appropriate level of prescribed fire burn boss for the prescribed fire project.

NOTE: The Qualification Determination Table guidance on the Prescribed Fire Complexity Rating Worksheet (Exhibit 6) is the minimum level of prescribed fire burn boss for the project being evaluated. Local management judgment and experience are most important in determining the appropriate level of qualification and experience for the prescribed fire burn boss. When management judgment and previous experience indicate a prescribed fire burn boss with greater qualifications and more experience is needed, a brief explanation of the circumstances should be included.

Instructions for Hazard Rating Guide

The list of hazard elements in the Hazard Rating Guide is ONLY a guide and is not meant to be all-inclusive nor represent every condition found in the wildland fire environment.

The rating criteria described for each rating are intended to be developed locally and act as guidelines for choosing the appropriate rating. If a specific project does not match precisely the stated criteria in every respect, the rater will have to use his/her best judgment to determine which rating is most appropriate. A project does not have to meet all listed rating criteria for a particular rating to qualify for that rating. Each higher rating category includes all the rating criteria listed for previous categories.

Hazard Elements

Disclaimer: The following descriptions of the hazard elements do not necessarily include all factors that may occur in different areas but they do provide a list of some of the most important factors. A more comprehensive list addressing the site-specific situation and associated concerns should be developed locally.

ENVIRONMENTAL FACTORS: ELEMENT: 1

Hazards within this element would include: Seasonal severity measured by an appropriate drought indicator; fire behavior measured by flame length and rate of spread; fuels measured by type, loading and moisture, weather measured by temperature, relative humidity, wind and climatological window of opportunity; and topography measured by slope and aspect.

AGENCY VALUES: ELEMENT: 2

Hazards within this element would include: Ecological and environmental consideration measured by how specific the prescription is and the spatial application of fire required for obtaining desired results; social values measured by acceptance by the public of fire application to an area; potential impact to cultural resources in or adjacent to the prescribed fire unit; project duration and logistics measured by anticipated duration in days to implement, timing of the prescribed fire (time of burning period, time of season, etc.); availability of resources, access and response time (including the possibility of delayed response for additional firefighting and logistical support); and smoke and air quality management measured by volume of smoke to be produced by time period and proximity/susceptibility to critical receptor sites.

PUBLIC VALUES: ELEMENT: 3

Hazards within this element would include: Examining public values located within or adjacent to the project area; potential for damage to sensitive species and their habitat, critical habitat for T and E species, and long-term monitoring or research sites. Potential impacts from fire or smoke to land use values located within or adjacent to the project area. Land use values include public and commercial use (i.e. commercial timber use), natural resource needs (watersheds), and recreational purposes, residences measured by number of occupants and compliance with FIREWISE standards; and non-residences measured by use and compliance with FIREWISE standards.

HUMAN FACTORS: ELEMENT: 4

Hazards within this element would include: Firefighter factors measured by exposure, fire techniques, duration of assignment, and support; public factors measured by exposure, issues with public health and safety and smoke impacts to roads and populated areas; fire management factors measured by experience of park management in prescribed fire and wildland fire management, acceptance of prescribed fire by park staff as a park management tool, and willingness of park staff to manage, support and prioritize the prescribed fire project over other park activities.

Hazard Rating Guide

Hazard Element	Hazard Probability			Potential Consequences		
	L	M	H	L	M	H
1. Environmental Data						
a. Seasonal severity						
b. Fire Behavior						
c. Fuels						
d. Weather						
e. Topography						
2. Agency Values						
a. Ecological and Environmental Considerations						
b. Social and Cultural Values						
c. Project Duration and Logistics						
d. Smoke and Air Quality Management						

WILDLAND FIRE MANAGEMENT
REFERENCE MANUAL – 18
Exhibit 2 – Hazard Rating Guide

Chapter 10
Page 30

Hazard Element	Hazard Probability			Potential Consequences		
	L	M	H	L	M	H
3. Public Values						
a. Land use values						
b. Dwellings						
c. Non-dwellings						
4. Human Factors						
a. Firefighter						
b. Public						
c. Fire Management						

Example: d. Social and Cultural Values	<ul style="list-style-type: none"> No known features of social, archeological, or cultural significance in the project area. 	<ul style="list-style-type: none"> Features of social, archeological, or cultural significance have been identified in the project area. Mitigation is identified and readily accomplished. 	<ul style="list-style-type: none"> Features of social, archeological, or cultural significance have been identified in the project area. Mitigation is questionable or difficult to accomplish. 	<ul style="list-style-type: none"> Problems, such as excessive fire severity or fire outside the planned unit, would not damage special sites known in the area. 	<ul style="list-style-type: none"> Problems or failures could result in moderate damage to special sites known in the area. Concerned parties are aware and supportive of the project. 	<ul style="list-style-type: none"> Problems or failures would result in substantial damage to or potential destruction of the special sites. Acceptance by concerned parties is low.

Instructions for
PRESCRIBED FIRE RISK ANALYSIS WORKSHEET

The Prescribed Fire Risk Analysis Worksheet provides a method to assess the risk of prescribed fires. The analysis incorporates risk ratings for specific hazards given the hazard probability and potential consequences. The accumulated risk ratings delineate the overall project risk and probability of success. The list of hazard elements is ONLY a guide and is not meant to be all-inclusive nor represent every condition found in the wildland fire environment. A more comprehensive list addressing the site-specific situation and associated concerns should be developed locally and incorporated into the Hazard Rating Guide (Exhibit 2). This process makes risk management work for all organizational levels and provides for communication between management and the operations personnel in the field.

HAZARD ELEMENT RATING CRITERIA

For each hazard element, users assign a rating to the hazard probability and potential consequences associated with managing that element. Values are Low, Moderate, or High for hazard probability and Low, Moderate, or High for potential consequences. Each higher rating category includes all the rating criteria listed for previous categories.

Complete this section by providing a completed Prescribed Fire Risk Analysis Worksheet and description of hazard probability and potential consequences values (Low, Moderate, High). When appropriate include the rationale for specific hazard probability and potential consequences selections.

PRESCRIBED FIRE RISK ANALYSIS WORKSHEET

Hazard Element	Hazard Probability			Potential Consequences			*Risk (Exhibit 4)
	L	M	H	L	M	H	
1. Environmental Data							
a. Seasonal severity							
b. Fire Behavior							
c. Fuels							
d. Weather							
e. Topography							
2. Agency Values							
a. Ecological and Environmental Considerations							
b. Social and Cultural Values							
c. Project Duration and Logistics							
d. Smoke and Air Quality Management							
3. Public Values							
a. Land use values							
b. Dwellings							
c. Non-dwellings							
4. Human Factors							
a. Firefighter							
b. Public							
c. Fire Management							

RATIONALE & MITIGATIONS: (Record below or on additional sheets)

***NOTE:** Risk is determined using the Risk – Assessment Matrix (Exhibit 4) by finding the intersection between the hazard probability and the potential consequence and entering the value as the “Risk” for that element.

Mitigations and controls to be taken will be identified and documented for each element defined above the Low Risk Level in the Prescribed Fire Risk Mitigation Table (Exhibit 5) and in the various applicable elements in the Prescribed Fire Plan. The highest risk value will be carried forward to the Prescribed Fire Complexity Rating Guide (Exhibit 6) as a reminder of those hazard elements requiring mitigation.

Risk - Assessment Matrix

			Hazard Probability		
			High	Moderate	Low
			H	M	L
Potential Consequences	High	H	High		
	Moderate	M		Moderate	
	Low	L			Low

Hazard Probability

- (H) High May occur frequently or requires continuous peak performance of resources implementing the project.
- (M) Moderate May occur sometimes or requires sporadic peak performance of resources implementing the project.
- (L) Low Is possible but improbable to occur or requires no increased performance of resources implementing the project.

Potential Consequences

- (H) High Major resource loss, significant property damage, permanent or partial disability to personnel or loss of life.
- (M) Moderate Minor resource loss, minor property damage, lost time injury or illness to personnel.
- (L) Low Negligible resource loss or property damage, possible first aid treatment to project personnel.

Risk Levels

- High** Impact or loss to park or public resources is unacceptable. Likely to have programmatic level impact and includes the loss of ability to accomplish prescribed fire at the unit level and potentially at the national level.
- Moderate** Impact or loss to park or public resources is controversial but tolerated. May have suspension of prescribed fire program at the unit level. Will require review prior to reinstatement.
- Low** Impact or loss to park or public resources is negligible. Little or no impact on the park prescribed fire program.

Instructions for
PRESCRIBED FIRE RISK MITIGATION TABLE

The Prescribed Fire Complexity Rating Worksheet (Exhibit 6) provides a method for outlining the necessary mitigations to reduce risk to an acceptable level. Mitigations actions may occur prior to ignition of the prescribed fire (completed fireline) or during the implementation of the prescribed fire (additional resources on-site).

The table is comprised of five columns. The first column is the hazard elements brought forward from the Prescribed Fire Risk Analysis Worksheet (Exhibit 3). Any hazard element for which there is mitigation action required shall be moved to this column. The second column is the risk value brought forward from the Prescribed Fire Risk Analysis Worksheet (Exhibit 3). The third column is a brief description of the mitigation actions to control the risk. Details about the mitigation actions must be provided in the prescribed fire plan. The fourth column is the residual risk remaining after the mitigations are performed. This requires reevaluating the hazard probability and potential consequences after the mitigation action is completed. The fifth column is the reference (Section and subsection) where the details of the mitigation actions are presented in the prescribed fire plan.

Information presented in this table, risk, need to mitigate, and residual risk, is for the evaluator to use as a reminder of the types and levels of risk present on the project and the anticipated difficulty in implementing the mitigations when selecting the appropriate complexity value.

PREScribed FIRE RISK MITIGATION TABLE

Hazard Element	Risk	Mitigations / Controls	Residual Risk	Reference:
		Briefly explain what actions will be taken relative to each hazard element that will reduce the risk.		In Prescribed Fire Plan
1. Environmental Data				
a. Seasonal Severity				
b. Fire Behavior				
c. Fuels				
d. Weather				
e. Topography				
2. Agency Values				
a. Ecological and environmental considerations				
b. Social and Cultural values				
c. Project duration and logistics				
d. Smoke and Air Quality Management				

WILDLAND FIRE MANAGEMENT

REFERENCE MANUAL – 18

Exhibit 5 – Prescribed Fire Risk Mitigation Table

Chapter 10

Page 36

Hazard Element	Risk	Mitigations / Controls	Residual Risk	Reference:
		Briefly explain what actions will be taken relative to each hazard element that will reduce the risk.		In Prescribed Fire Plan
3. Public Values				
a. Land use values				
b. Dwellings				
c. Non-dwellings				
4. Human Factors				
a. Firefighter				
b. Public				
c. Fire Management				
Example: 1. Environmental – Fuels	H	Ladder fuels within one (1) chain of the control line will be removed 6-8 feet above the ground prior to ignition to reduce the potential of torching and crowning adjacent to the line.	M	I. Pre-burn Considerations – Line preparation

Instructions for
PRESCRIBED FIRE COMPLEXITY RATING WORKSHEET

The Prescribed Fire Complexity Rating Worksheet provides a method to assess the complexity of a prescribed fire and guides determination of the organizational structure and level of experience and qualifications of the burn boss needed to successfully implement the project. The list of complexity elements is ONLY a guide and is not meant to be all-inclusive nor represent every condition found in the wildland fire environment.

The Prescribed Fire Complexity Rating Worksheet is accompanied by a Complexity Value Guide (Exhibit 7) for each complexity element shown.

COMPLEXITY VALUE RATING CRITERIA

For each complexity element, users assign a value to the operational conditions and technical difficulty associated with managing that element on this project. Values are Low (L), Moderate (M), and High (H). No other values are permitted. The rating criteria described for each rating level are intended to be guidelines for choosing the appropriate rating. A project does not have to meet all listed criteria for a particular complexity value to qualify for that value. Each higher complexity value category includes all the criteria listed for previous categories. If a specific project does not match precisely the stated criteria in every respect, the rater will have to use their best judgment to determine which complexity value is most appropriate.

The individual who prepared it and the agency administrator who reviewed it must sign the Prescribed Fire Complexity Rating Worksheet. It must be reviewed and signed by the prescribed fire burn boss and have the level of Prescribed Fire Burn Boss checked immediately prior to implementing the prescribed fire to ensure that all the complexity elements and the accompanying values have remained the same since the plan was completed.

PREScribed FIRE COMPLEXITY RATING WORKSHEET

Complexity Element		Complexity Value		
		L	M	H
Primary Factors	1. Life and Safety			
	2. Threats to Boundaries			
	3. Management Organization			
	4. Political Concerns			
	<i>SUBTOTAL OF PRIMARY FACTORS</i>			
Secondary Factors	5. Objectives			
	6. Fuels and Fire Behavior			
	7. Air Quality Values			
	8. Improvements			
	9. Logistics			
	10. Natural, Cultural and Social Values			
	11. Tactical Operations			
	12. Interagency Coordination			
	<i>SUBTOTAL OF SECONDARY FACTORS</i>			
TOTAL COUNT OF COMPLEXITY VALUES				

QUALIFICATIONS DETERMINATION TABLE:

	Prescribed Fire Burn Boss Type 2 (RXB2)	Prescribed Fire Burn Boss Type 1 (RXB1)
Primary Factors rated "H"	Less than 2	2 or more
	AND	OR
Total Count rated "H"	Less than 4	4 or more
		OR
	Minimum required on all prescribed fires.	When deemed appropriate by the agency administrator or unit Fire Management Officer.
Prescribed Fire Burn Boss Level Indicated (check one):		<input type="checkbox"/> RXB1 <input type="checkbox"/> RXB2

PREPARED BY: _____

DATE: _____

APPROVAL BY: _____

DATE: _____

Agency Administrator

REVIEWED BY: _____

DATE: _____

(Burn Boss immediately prior to burning)

Complexity Value Guide

COMPLEXITY ELEMENT	GUIDE TO COMPLEXITY VALUE		
	L	M	H
Life and Safety	<ul style="list-style-type: none"> Safety issues are easily identifiable and mitigated 	<ul style="list-style-type: none"> Number of significant issues have been identified All safety hazards have been identified on the LCES worksheet and mitigated 	<ul style="list-style-type: none"> SOF1 or SOF2 required Complex safety issues exist
Threats to Boundaries	<ul style="list-style-type: none"> Low threat to boundaries POI<50% Boundaries naturally defensible 	<ul style="list-style-type: none"> Moderate threat to boundaries 50<POI<70% Moderate risk of slopover or spot fires Boundaries need mitigation actions for support to strengthen fuel breaks, firelines, etc. 	<ul style="list-style-type: none"> High threat to boundaries POI>70% High risk of slopover or spot fires Mitigation actions necessary to compensate for continuous fuels
Management Organization	<ul style="list-style-type: none"> Span of control held to 3 Single resource incident or project 	<ul style="list-style-type: none"> Span of control held to 4 Multiple resource incident or project Short-term commitment of specialized resources 	<ul style="list-style-type: none"> Span of control greater than 4 Multiple branch, divisions or groups Specialized resources needed to accomplish objectives Organized management team (FUMT, IMT)
Political Concerns	<ul style="list-style-type: none"> No impact on neighbors or visitors No controversy No media interest 	<ul style="list-style-type: none"> Some impact on neighbors or visitors Some controversy, but mitigated Press release issued, but no media activity during operations 	<ul style="list-style-type: none"> High impact on neighbors or visitors High internal or external interest and concern Media present during operations
Objectives	<ul style="list-style-type: none"> Maintenance objectives Prescriptions broad Easily achieved objectives 	<ul style="list-style-type: none"> Restoration objectives Reduction of both live and dead fuels Moderate to substantial changes in two or more strata of vegetation Objectives judged to be moderately hard to achieve Objectives may require moderately intense fire behavior 	<ul style="list-style-type: none"> Restoration objectives in altered fuel situations Precise treatment of fuels and multiple ecological objectives Major change in the structure of 2 or more vegetative strata Conflicts between objectives and constraints Requires a high intensity fire or a combination of fire intensities that is difficult to achieve

COMPLEXITY ELEMENT	GUIDE TO COMPLEXITY VALUE		
	L	M	H
Fuels/Fire Behavior	<ul style="list-style-type: none"> • Low variability in slope & aspect • Weather uniform and predictable • Surface fuels (grass, needles) only • Grass/shrub, or early seral forest communities • Short duration fire • No drought indicated 	<ul style="list-style-type: none"> • Moderate variability in slope & aspect • Weather variable but predictable • Ladder fuels and torching • Fuel types/loads variable • Dense, tall shrub or mid-seral forest communities • Moderate duration fire • Drought index indicates normal conditions to moderate drought; expected to worsen 	<ul style="list-style-type: none"> • High variability in slope & aspect • Weather variable and difficult to predict • Extreme fire behavior • Fuel types/loads highly variable • Late seral forest communities or long-return interval fire regimes • Altered fire regime, hazardous fuel /stand density conditions • Potentially long duration fire • Drought index indicates severe drought; expected to continue
Air Quality Values to be Protected	<ul style="list-style-type: none"> • Few smoke sensitive areas near fire • Smoke produced for less than 1 burning period • Air quality agencies generally require only initial notification and/or permitting • No potential for scheduling conflicts with cooperators 	<ul style="list-style-type: none"> • Multiple smoke sensitive areas, but smoke impact mitigated in plan • Smoke produced for 2-4 burning periods • Daily burning bans are sometimes enacted during the burn season • Infrequent consultation with air quality agencies is needed • Low potential for scheduling conflicts with cooperators 	<ul style="list-style-type: none"> • Multiple smoke sensitive areas with complex mitigation actions required • Health or visibility complaints likely • Smoke produced for greater than 4 burning periods • Multi-day burning bans are often enacted during the burn season • Smoke sensitive class 1 airsheds • Violation of state and federal health standards possible • Frequent consultation with air quality agencies is needed • High potential for scheduling conflicts with cooperators
Improvements to be Protected	<ul style="list-style-type: none"> • No risk to people or property within or adjacent to fire 	<ul style="list-style-type: none"> • Several values to be protected • Mitigation through planning and/or preparations is adequate • May require some commitment of specialized resources 	<ul style="list-style-type: none"> • Numerous values and/or high values to be protected • Severe damage likely without significant commitment of specialized resources with appropriate skill levels
Logistics	<ul style="list-style-type: none"> • Easy access • Duration of fire support is less than 4 days 	<ul style="list-style-type: none"> • Difficult access • Duration of fire support between 4 and 10 days • Logistical position assigned • Anticipated difficulty in obtaining resources 	<ul style="list-style-type: none"> • No vehicle access • Duration of support is greater than 10 days • Multiple logistical positions assigned • Remote camps and support necessary

COMPLEXITY ELEMENT	GUIDE TO COMPLEXITY VALUE		
	L	M	H
Natural, Cultural, and Social Values to be Protected	<ul style="list-style-type: none"> No risk to natural, cultural, and/or social resources within or adjacent to fire 	<ul style="list-style-type: none"> Several values to be protected Mitigation through planning and/or preparations is adequate May require some commitment of specialized resources 	<ul style="list-style-type: none"> Numerous values and/or high values to be protected Severe damage likely without significant commitment of specialized resources with appropriate skill levels
Tactical Operations	<ul style="list-style-type: none"> No ignition or simple ignition patterns Single ignition method used Holding requirements minimal 	<ul style="list-style-type: none"> Multiple firing methods and/or sequences Use of specialized ignition methods (i.e. terra-torch, Premo Mark III) Resources required for up to one week Holding actions to check, direct, or delay fire spread 	<ul style="list-style-type: none"> Complex firing patterns highly dependent upon local conditions Simultaneous use of multiple firing methods and/or sequences Simultaneous ground and aerial ignition Use of heli-torch Resources required for over one week Multiple mitigation actions at variable temporal and spatial points identified. Success of actions critical to accomplishment of objectives Aerial support for mitigation actions desirable/necessary
Interagency Coordination	<ul style="list-style-type: none"> Cooperators not involved in operations No concerns 	<ul style="list-style-type: none"> Simple joint-jurisdiction fires Some competition for resources Some concerns 	<ul style="list-style-type: none"> Complex multi-jurisdictional fires High competition for resources High concerns

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**AGENCY ADMINISTRATOR
GO/NO-GO PRE-IGNITION APPROVAL**

Prescribed Fire Name: _____

Date: _____

Instructions

The Agency Administrator's Go/No-Go Pre-Ignition Approval is the first of two GO/NO-GO decisions that must be completed before a prescribed fire can be implemented. The Agency Administrator's Go/No-Go Pre-Ignition Approval is the final management approval prior to execution of the prescribed fire and evaluates whether compliance requirements, prescribed fire plan elements, and internal and external notifications have been completed. The Agency Administrator's Go/No-Go Pre-Ignition Approval is valid for 30 days. If ignition of the prescribed fire is not initiated prior to expiration date determined by the Agency Administrator, a new approval will be required.

Key Elements

1. Is the prescribed fire plan up to date?
Hints: changes, amendments, seasonality.
2. Have all compliance requirements been completed?
Hints: cultural, threatened and endangered species, smoke management.
3. Is risk management in place and the residual risk acceptable?
Hints: Prescribed Fire Mitigation Table and Prescribed Fire Complexity Rating Guide completed with rationale and mitigations identified.
4. Will all elements of the prescribed fire plan be met?
Hint: preparation work, mitigation, weather, organization, prescription.
5. Have all internal and external notifications and media releases been completed?
6. Are key park staff fully briefed, and understand the implementation of the prescribed fire?
7. Other?

Recommended by: _____ Date _____
FMO/Burn Boss

Approved by: _____ Date _____
Park Superintendent

Approval expires: _____ (May not be more than 30 days after approved date.)
Date

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WILDLAND FIRE MANAGEMENT**REFERENCE MANUAL - 18****Exhibit 9 – Prescribed Fire Operations GO/NO-GO Checklist**

Chapter 10

Page 45

Prescribed Fire Operations
GO/NO-GO Checklist

Prescribed Fire Name:

Date:

	YES	NO
- Has Agency Administrator GO/NO-GO Pre-Ignition Approval been approved?		
Narrative/Comments:		
- Are current and forecasted weather conditions favorable for execution of the prescribed fire? (hints: spot weather, dialogue with fire weather forecaster, climatological analysis complete)		
Narrative/Comments:		
- Have all key personnel listed on the Incident Action Plan (IAP) been briefed with an opportunity to give feedback? (hints: safety, objectives, assignments)		
Narrative/Comments:		
- Has all pre-burn preparedness work been completed? (hints: fuels and weather observations, signs, closures, smoke management, unit preparation)		
Narrative/Comments:		
- Are all equipment and supplies required in the prescribed fire plan in place and functional? (hints: pumps, radios, ignition devices, hose lays, vehicles, aviation, etc.)		
Narrative/Comments:		
- Are all holding resources described in the IAP committed and can be on-scene within specified time frames?		
Narrative/Comments:		
- Are all personnel certified for their assigned positions? (hints: Check Red Cards)		
Narrative/Comments:		
- There are no extenuating circumstances that preclude successful completion of this project? (hints: regional & national preparedness, unusual circumstances, unusual drought, outstanding issues, other fires, recent fire escapes, etc.)		
Narrative/Comments:		

WILDLAND FIRE MANAGEMENT

REFERENCE MANUAL - 18

Exhibit 9 – Prescribed Fire Operations GO/NO-GO Checklist

Chapter 10

Page 46

	YES	NO
IF ALL BOXES HAVE BEEN CHECKED "YES" YOU MAY PROCEED WITH THE TEST FIRE.		
TEST FIRE DOCUMENTATION AND RESULTS:		
- Observed Fire Behavior within Prescription?		
Narrative/Comments:		
- Test fire was successful?		
Narrative/Comments:		
- Are all prescription parameters in the prescribed fire plan favorable for implementing the project? (hints: each plan element, pre-burn, smoke management, coordinator coordination)		
Narrative/Comments:		
IF LAST 3 BOXES ARE ALL "YES", YOU MAY PROCEED WITH PRESCRIBED FIRE.		

Signatures

<u>RX BURN BOSS:</u>	<u>IGNITION SPECIALIST:</u>
<u>HOLDING OPERATIONS:</u>	<u>DATE:</u>

WILDLAND FIRE MANAGEMENT**REFERENCE MANUAL - 18****Exhibit 10 – Adequate Holding Resources Worksheet**

Chapter 10

Page 47

**ADEQUATE HOLDING RESOURCES WORKSHEET
FOR PRESCRIBED FIRE**

Project Name: _____

Fuel Models Inside Project Area: _____

Prepared By/Date: _____

Fuel Models Outside Project Area: _____

Characteristics	Output type	Modeling Predictions Inside Project Area	Modeling Predictions Outside Project Area	Unit of Measure
CRITICAL FIRE INPUTS	1 Hr Fuel Moisture			%
	Wind Speed			MPH
	Slope			%
KEY FIRE BEHAVIOR OUTPUTS	Rate of Spread (ROS)			ch/hr
	Fireline Intensity			BTU/ft/sec
	Flame Length			Feet
	Probability of Ignition			%
	Spotting Distance			Miles
	Scorch Height			Feet
FIRE SIZE	Projection Time			Hours
	Forward Spread			Chains
	Backward Spread			Chains
FIRE CONTAINMENT	Method Of Attack			Head/Rear
	Max Escape Target			Acres
	Max Containment Time			Hours
	Total Line Building Rate			Ch/hr
1. Choose greater total line building rate from inside and outside the project area				Ch/hr
2. Estimate potential number spot fires or slopovers at one time:				
3. TOTAL LINE BUILDING RATE NEEDED (multiply line 1 times line 2)				Ch/hr

Production Rates: _____ Ease of Access: _____
(refer to fireline handbook other sources and local knowledge)

POOR-FAIR-GOOD-EXCELLENT (circle)

On Site Organization	Total # Planned On Burn	Total # Dedicated to Prescribed Fire	Total # Available for Spot Fire or Slopover Control		Line Building Production Rates		Spot Fire or Slopover Line Building Capacity
Overhead				X		ch/hr	
Firing Crew				X		ch/hr	
Holding				X		ch/hr	
Other Personnel				X		ch/hr	
Engine (Crew of)				X		ch/hr	
Dozer (Size)				X		ch/hr	
Other				X		ch/hr	
Other				X		ch/hr	
Other				X		ch/hr	
4. TOTAL CAPACITY							
3. TOTAL LINE BUILDING RATE NEEDED (from table above)							
5. DETERMINATION OF ADEQUATE HOLDING RESOURCES (Line 4 minus Line 3)						ch/hr	

If number on line 5 is positive then adequate holding forces will be available. If number is negative, more holding resources are needed.

APPENDIX ____

PRESCRIBED FIRE PLAN - TECHNICAL REVIEW

Park: _____

Project Name: _____

Prescribed Fire Plan Elements	Status	Date	Initial
a. Signature Page			
b. Executive Summary			
c. Description of Prescribed Fire Area			
d. Goals and Objectives			
e. Project Complexity/Risk			
f. Organization			
g. Cost			
h. Scheduling			
i. Preburn Considerations			
j. Prescription			
k. Ignition & Holding Actions			
l. Wildland Fire Transition Plan			
m. Protection of Sensitive Features			
n. Public and Firefighter Safety			
o. Smoke Management			
p. Interagency Coordination and Public Information			
q. Monitoring			
r. Post Fire Rehabilitation			
s. Post Fire Reports			
t. Appendices			

Status Coding:

- + Adequate – Meets NPS Standards
- 0 Adequate with modification. See comments.
- Deficient. See comments.
- NC Unable to evaluate.

Comments:

Signature: _____

Date: _____

Title: _____

Office: _____

APPENDIX _____

REVIEWER COMMENTS: _____ PRESCRIBED FIRE PLAN

Please note any comments you may have pertaining to this prescribed fire plan.

FIRE MANAGEMENT OFFICER

DIVISION OF VISITOR & RESOURCE PROTECTION

DIVISION OF NATURAL RESOURCES

DIVISION OF CULTURAL RESOURCES AND INTERPRETATION

SUPERINTENDENT

OTHER

POST-PROJECT EVALUATION

Instructions for Completion of Post-Project Evaluation Form

This form is to be completed and submitted for review within 30 days of declaring the project complete.

Block 1 Self-explanatory

Block 2 Copy of the Project Objectives as listed in the Project Plan.

Block 3 Give quantitative results of how well objectives were met, i.e. % of 1 hour and 10 hour fuels removed, % of burn area with fuels reduced, % of area with acceptable/unacceptable scorch, etc.

Block 4 Give a short narrative of problems encountered and suggestions for improving or refining operations and prescriptions i.e. firing pattern, equipment limitations, drought index, effectiveness of barriers.

Block 5 Self-explanatory - for providing feedback to the Program

Block 1)

Individual Leading Evaluation: _____

Management: _____ **Project Name:** _____

Acres Treated: _____ **Fire Number:** _____

Total Cost: _____ **Cost/Acre:** _____

(Block 2)

Objectives:

(Block 3)

Results:

(Block 4)

Problems Encountered, Methods to Improve Next Operation:

Review & Signature:

Burn Boss: _____

Comments:

FMO: _____

Comments:

JOB HAZARD ANALYSIS

United States Department of Interior NATIONAL PARK SERVICE	1.WORK PROJECT/ACTIVITY	2.LOCATION	3.UNIT
JOB HAZARD ANALYSIS (JHA)	4.NAME OF ANALYST	5.JOB TITLE	6.DATE PREPARED
7. TASKS/PROCEDURES	8. HAZARDS	9. ABATEMENT ACTIONS ENGINEERING CONTROLS – SUBSTITUTION - ADMINITSTRATIVE CONTROLS - PPE	
10. SUPERVISOR'S SIGNATURE		11. TITLE	12. DATE

Job Hazard Analysis Instructions

The Job Hazard Analysis (JHA) shall identify the location of the work project or activity, the name of employee(s) writing the JHA, the date(s) of development, and the name of the appropriate supervisor approving it. The supervisor acknowledges that employees have read and understand the contents, have received the required training, and are qualified to perform the work project or activity.

Blocks 1, 2, 3, 4, 5, and 6: Self explanatory.

Block 7: Identify all tasks and procedures associated with the work project or activity that have potential to cause injury or illness to personnel and damage to property, material, or environment. Include emergency evacuation procedures.

Block 8: Identify all known or suspect hazards associated with each respective task/procedure listed in block 7. For example:

- a. Research past accidents/incidents
- b. Discuss the work project/activity with participants.
- c. Observe the work project/activity.
- d. A combination of the above.

Block 9: Identify appropriate actions to reduce or eliminate the hazards identified in block 8. Abatement measures listed below are in the order of the preferred abatement method:

- a. Engineering Controls (the most desirable method of abatement). For example, ergonomically designed tools, equipment and furniture.
- b. Substitution. For example, changing to non-flammable, non-toxic, biodegradable solvents.
- c. Administrative Controls. For example, limiting exposure by reducing the work schedule.
- d. PPE (least desirable method of abatement). For example, using hearing protection when working with or close to portable machines (chain saws, rock drills, portable water pumps).
- e. A combination of the above.

Block 10: The JHA must be reviewed and approved by a supervisor. Attach a copy of the JHA as justification for purchase orders when procuring PPE.

Block 11 and 12: Self explanatory.

JHA – Emergency Evacuation Instructions

Work supervisor and crew members are responsible for developing and discussing field emergency evacuation procedures (i.e., medical plan) and alternatives in the event a person(s) become ill or injured at the worksite and needs to be expediently transported from the scene.

Be prepared to provide the following information:

- a. Nature of the accident or injury (avoid using victim's name).
- b. Type of assistance needed, if any (ground, air, or water evacuation)
- c. Location of accident or injury, best access route into the worksite (road name/number), identifiable ground/air landmarks.
- d. Radio frequency(ies).
- e. Contact person.
- f. Local hazards to ground vehicles or aviation.
- g. Weather conditions (wind speed & direction, visibility, temp).
- h. Topography.
- i. Number of person(s) to be transported.
- j. Estimated weight of passengers for air/water evacuation.

These items listed above serve only as guidelines for the development of emergency evacuation procedures.

JHA and Emergency Evacuation Procedures Acknowledgement

As supervisor, I acknowledge that the following employees have participated in the development of this JHA and accompanying emergency evacuation procedures, and have also been briefed on the provisions, thereof, on _____.

Supervisor's Signature

Supervisor's Name

A. SIGNATURE PAGE

Disclaimer: This example is provided to show a format including all the required elements.

LASSEN VOLCANIC NATIONAL PARK

SAMPLE PRESCRIBED FIRE PLAN

UNIT NAME: EMIGRANT

Prepared By: /s/ John Park
Fuels Management Specialist

Date: August 20th, XXXX

Reviewed By: /s/ Clark Kent
Fire Management Officer

Date: August 23rd, XXXX

Chief, Visitor & Resources Protection

Date: _____

Chief, Resources Management

Date: _____

Chief, Cultural Resources & Interpretation

Date: _____

The approved prescribed fire plan constitutes a delegation of authority to burn. No one has the authority to burn without an approved plan or in a manner not in compliance with the approved plan. Actions taken in compliance with the approved prescribed fire plan will be fully supported. Personnel will be held accountable for actions taken that are not in compliance with elements of the approved plan regarding execution in a safe and cost-effective manner.

Approved By: /s/ Sheila Jones
Superintendent

Date: September 1st, XXXX

FIREPRO Project #: 0103
Multi-Project Planning Area: Raker

Copies of approved plan will be sent to:

- Shasta County Air Quality District
- Susanville Interagency Fire Center
- Hat Creek Ranger District, Lassen National Forest

TABLE OF CONTENTS

SECTION	TITLE	PAGE
A.	Signature Page	
B.	Executive Summary	
C.	Description Of Prescribed Fire Area	
D.	Goals And Objectives	
E.	Project Complexity	
F.	Organization	
G.	Cost	
H.	Scheduling	
I.	Pre-Burn Considerations	
J.	Prescription	
K.	Ignition And Holding Actions	
L.	Wildland Fire Transition Plan	
M.	Protection Of Sensitive Features	
N.	Public And Personnel Safety	
O.	Smoke Management And Air Quality	
P.	Interagency Coordination And Public Notification	
Q.	Monitoring	
R.	Post Fire Rehabilitation	
S.	Post Fire Reports	
T.	Appendices	
	1. Vicinity Map	
	2. Project Map	
	3. Prescribed Fire Complexity Rating Guide w/Aerial Ignition	
	4. Prescribed Fire Complexity Rating Guide	
	5. Fire Modeling Outputs	
	6. Adequate Holding Resources Worksheet w/Aerial Ignition	
	7. Adequate Holding Resources Worksheet	
	8. Adequate Holding Resources Worksheet – Partial Operation	
	9. Agency Administrator GO/NO-GO Pre-Ignition Approval	
	10. Prescribed Fire Operations GO/NO-GO Checklist	
	11. Pre-Burn Prescribed Fire Checklist	

B. EXECUTIVE SUMMARY

This project is the first prescribed fire being conducted as part of the Raker Multi-Project Planning area. Prescribed fires have been completed along nearby portions of the park's northern boundary since 1993. This multi-project planning area is one of six similar multi-project areas being implemented at Lassen Volcanic NP, which are designed to achieve hazard fuels reduction and perpetuate natural processes.

Direction to utilize prescribed fire to achieve goals and objectives further stated in this burn plan comes from the parks Resource Management and Fire Management Plans. The 2001 Review and Update of the 1995 Federal Wildland Policy mandates federal land management agencies within fire dependent communities to reintroduce and maintain fire as part of the ecosystem and conduct all prescribed fire projects consistent with land and resource management plans, public health considerations, and approved prescribed fire plans. The policy of using fire as a tool will help decrease risks to life, property and resources and help perpetuate the natural resource values for which this national park was established.

C. DESCRIPTION OF PRESCRIBED FIRE AREA

1.) Area Description: Burn unit is north of Raker Peak and located along the north boundary of the park. Hat Creek runs through the unit.

2.) Location: Township 31N, Range 5E, Sec. 17,18
Latitude 40.33' 30" N
Longitude 121.32'30" W

UTM Zone 10, Easting 6.31 Northing 44.89.5

3.)Size: 558 acres

Elevation
Range: 6140' - 6280'

Slope(s): 0-35%, average - 5%

Aspect(s): flat to slight southeast aspect

4.) Description of Project Boundaries:

The burn unit is located in a forested area directly northeast of Raker Peak. The south, west, and north boundaries are 3' wide fire lines. The east boundary is a single lane dirt road (Inholders Road/Nobles Emigrant Trail).

5.) Vegetation Types and NFFL Fuel Model including Fuel Loading and Dead Fuels:

WILDLAND FIRE MANAGEMENT

REFERENCE MANUAL - 18

Exhibit 15 – Sample Prescribed Fire Plan

Chapter 10

Page 57

The burn unit is mainly flat terrain with an open canopy forest. Some dense closed canopy forested areas are found along the eastern and western burn unit boundaries. Ground fuels are widely spaced with areas of long needle litter, short needle litter and open pumice soils. Hat Creek runs parallel to the eastern unit boundary inside the burn unit. No fire effects plots are within this unit.

65% -- Jeffrey pine-lodgepole pine forest (fuel models 8 and 9): This forest type is found throughout the burn unit and comprises nearly the entire interior portions. Overstory dominant trees are mature Jeffrey pines with a sub canopy of intermediate-aged lodgepole pine. White fir is found occasionally in this vegetation type. The tree canopy height averages 80' with approximately 50% canopy closure. One-hundred foot tall Jeffrey pine snags are widely spaced throughout the unit. Understory tree regeneration is widely spaced and does not create a good ladder fuel component. Surface litter fuels below the canopy consist of long needle and short needle litter, 0.3"-8" in depth, scattered branch cast litter (1,10, and 100-hour time lag fuels), and widely spaced dead and down trees (1000-hour time lag fuels). Non-continuous annual and perennial grasses are also present throughout the unit.

20% -- Lodgepole pine forest (fuel model 8): This forest type is found in a ¼-mile wide band along the eastern unit boundary (Inholder's road). A dense lodgepole pine forest with a closed canopy averages 70' tall. Many of the trees have dead branch limbs extending down the entire tree bole, which create fairly good ladder fuels. Surface litter fuels are short compact needle litter (1"- 6" in depth) with branch cast litter and widely spaced dead and down logs.

15% -- White fir – Jeffrey pine forest (fuel model 10): A ¼-mile band of Jeffrey pine forest with patches of thick white fir regeneration occurs along the western and northern unit boundaries. Canopy height is more varied in this area and averages 60'-100'. Patches of fir regeneration add to the ladder fuel component. Ground fuels have both short and long needle litter depending on tree type above the forest floor. Surface litter fuels are 2-12" in depth with patches of heavy branch cast litter and jackpots of dead and down logs scattered every 60'-150' apart.

Vegetation Type	Fuel Model NFFL & NFDRS	% of unit	# acres based on %	Estimated tons per acre
Intermediate to mature-aged Jeffrey pine and lodgepole pine forest with sparse short and long needle litter and widely spaced dead and down trees	8/9 H,U	65%	362	10
Lodgepole pine forest with closed canopy, short needle litter and heavy dead and down jackpots	8 H	20%	111	12
White fir/Jeffrey pine forest with white fir regeneration, long and short needle litter (2-12" depth) and heavy dead and down jackpots	10	15%	85	38

Note: Estimated tons-per-acre for fuel models come from Lost Creek fire effects plots and Aids to Determining Fuel Models For Estimating Fire Behavior, Anderson.

VICINITY MAP (attachment)

PROJECT MAP (attachment)

D. GOALS AND OBJECTIVES

GOALS

1. Hazard Fuels Reduction- A low to moderate intensity understory burn will reduce dead and down forest fuels, fire prune lower tree branches, and cause some mortality of mainly shade tolerant tree species (white fir). Reduced hazard fuels near the NPS/USDA-FS boundary will help slow future wildland fire spread entering or leaving the park. Also, the burn will reinforce the buffer zone around the wildland fire use zone.

2. Restore Natural Processes- This prescribed fire will reintroduce fire back into a fire-dependent ecosystem. Prescribed fires planned along the park boundary will help maintain the vegetation types that are adapted to this area's natural fire regime. The burn will consume litter and duff creating a sterile wood ash seedbed for pine regeneration.

3. Complete the first prescribed fire unit of the Raker multi-year prescribed fire project area.

SPECIFIC OBJECTIVES:	PROPOSED REDUCTION WITHIN ONE YEAR	ACTUAL RESULTS
Dead & Down (1, 10, & 100 hr.) time lag fuels	30-80%	
Dead & Down (1000 hr.) time lag fuels	20-50%	
Litter & Duff (tons/acre)	20-75%	
Seedling & pole-sized tree density(<15cm dbh)	25-75%	
Overstory tree mortality (>60cm dbh)	<20%	
	PROPOSED INCREASE WITHIN FIVE YEARS	
Seedling & pole-sized Jeffrey pine density.	20%	

Range of Acceptable Results Expected Across The Project Area

Throughout the entire unit a mosaic of different levels of fire severity are desired resulting in zero to ninety-percent vegetation mortality. Low intensity understory burning and fire effects are desired along a 50-200' wide strip around the burn unit boundary to limit risk of a fire escape.

No fire spread: Up to 20% of the unit should receive limited to no fire spread such as riparian wet areas along Hat Creek and shaded northern aspects.

Understory burning: At least 40% of the unit should experience low to moderate intensity fire and achieve dead and down fuel reduction objectives. Some seedling and pole-sized tree mortality should also occur in these areas.

Small areas of tree mortality: Small pockets of forest vegetation less than 0.2-acre in size may receive moderate to high intensity fire over no more than 30% of the burn unit. This fire intensity will kill branches of the lower one-third of overstory tree canopy and cause no more than 60% mortality of medium-sized trees within these small pockets.

Large areas of tree mortality: No more than five separate areas less than five acres in size should burn hot enough that nearly all trees and understory vegetation will be killed. These newly created openings (gaps) will mimic natural breaks in vegetation communities that were more prevalent prior to fire suppression in the area. New gaps will total no more than 40-acres of the unit.

E. PROJECT COMPLEXITY

The burn unit is located along the Lassen National Forest boundary with limited vehicular access. Aerial ignition operations are planned due to large burn unit size and limited access.

Aerial operations add enough hazards to the project to rate the project as “High” in overall complexity and require a RXB1.

See attached Prescribed Fire Complexity Rating Worksheet.

F. ORGANIZATION

The described organizations are minimum resources required to implement the project under the possibility of three different scenarios. The decision to conduct the project using a different organization scenario will depend on time of year, day, fuel and weather conditions, and amount of the project previously completed. The Burn Boss may order additional resources to assist with the project as long as no slopovers or spot fires are occurring. All non-park resources will be ordered and committed to the prescribed fire project through the Susanville Interagency Dispatch Center. The holding resource worksheet and Fireline Handbook will be used to determine adequate number and type of holding resources for each scenario. Specific resources will be identified in an incident action plan prepared prior to each operational period during the implementation of the burn.

1. Full Operation with Aerial Ignition

Overhead Personnel:

- 1 Burn Boss (RXB1)
- 1 Ignition Specialist (RXI1 if using aerial ignition)
- 1 Ground Ignition Team Leader (RXI2)
- 1 Holding Group Supervisor (DIVS)
- 2 Holding Supervisors (CRWB)
- 2 Prescribed Fire Monitors (FEMO)
- 1 person for Logistics/Finance/Time Recorder

Additional Crews/Personnel/Resources For Daytime Holding and Ignition Operations:

- 3 Type I or II hand crews (60 personnel)
- 2 Type 3 or 4 engines (Minimum crew of 4)
- 1 Ignition group (6 people)
- 1 Type II or III helicopter w/PSD machine and bucket
- 1 PSD operator
- 1 Helispot manager & support crew (3 people)

Additional Crews/Personnel/Resources for Nighttime Holding Operations:

- 1 Holding Group Leader (CRWB)
- 1 Type 3 or 4 engine (Minimum crew of 4/engine)
- 6 Firefighters

2. Full Operation without Aerial Ignition

Overhead Personnel:

- 1 Burn Boss (RXB2)
- 1 Ignition Specialist (RXI2)
- 1 Holding Group Supervisor (DIVS)
- 2 Holding Supervisors (CRWB)

WILDLAND FIRE MANAGEMENT
REFERENCE MANUAL - 18
Exhibit 15 – Sample Prescribed Fire Plan

Chapter 10
Page 61

2 Prescribed Fire Monitors (FEMO)
1 person for Logistics/Finance/Time Recorder

Additional Crews/Personnel/Resources For Daytime Holding and Ignition Operations:

4 Type I or II hand crews (80 personnel)
3 Type 3 or 4 engines (Minimum crew of 4/engine)
1 Ignition Crew (20 personnel)

Additional Crews/Personnel/Resources for Night time Holding Operations:

1 Holding Group Leader (CRWB)
1 Type 3 or 4 engine (Minimum crew of 4/engine)
6 Firefighters

3. Partial Operation (Blacklining or burning jackpot piles within the unit during low ends of the prescription)

Overhead Personnel:

1 Burn Boss (RXB2)
2 Prescribed Fire Monitors (FEMO)

Additional Crews/Personnel/Resources For Holding and Ignition Operations:

1 Holding Group Supervisor (TFLD)
2 squads (12 personnel)
1 Type 3 or 4 engines (Minimum crew of 4/engine)
2 Fuels Crews (40 personnel) working on preparation in adjacent unit.
1 Ignition Group (CRWB + 6)

G. ESTIMATED PROJECT COSTS (non-base, other agency, contract)

Item:	Project Phase:	Planning	Preparation	Execution	Evaluation
Personnel		\$620.00	\$4600.00	\$12560.00	\$300.00
Equipment (mileage)		\$100.00	\$100.00	\$650.00	\$100.00
Supplies			\$650.00	\$2300.00	
Aircraft				\$3500.00	
Phase Costs		\$1370.00	\$5350.00	\$19010.00	\$400.00

TOTAL ESTIMATED ADDITIONAL PROJECT COST:	\$26130.00
TOTAL ESTIMATED BASE FUNDING PROJECT COST:	<u>\$14000.00</u>
COMBINED ESTIMATED TOTAL PROJECT COST (including base funding)	\$40130.00
ESTIMATED TOTAL COST PER ACRE: (\$40130/558-acres)	\$71.91

H. SCHEDULING

Proposed Ignition Date.....September 15th, XXXX - October 10th, XXXX

Projected Burn Duration.....2-4 days

Dates when burn will not be conducted:

1. No-burn day as determined by Shasta Air Quality Management District.
2. National or Regional Preparedness Levels preclude new prescribed fires.
3. Holidays and times of high visitor use.

I. PRE-BURN CONSIDERATIONS

PREPARATION NEEDS ON SITE:

1. ONE WEEK BEFORE BURN:
 - a. Re-rake fire lines surrounding the burn unit. Cut out any logs across all fire lines. Fall snags that could cause excessive spot fires or safety problems.
 - b. Install hygrothermograph and 10 hr. fuel sticks at burn site at least one week prior to ignition date.
 - c. Take pre-burn photos of unit and record photo point locations.
 - d. Set out bladder bags or hoselay equipment along unit boundaries as needed.
 - e. Check water sources and drafting sites as designated on project map.
 - f. Flag private land areas on site.
 - g. Ensure Lost Creek helispot is ready for helicopter operations.
2. ONE DAY BEFORE BURN:
 - a. Set up mini-vol air sampling machine at Old Station USDA-FS station.
3. DAY OF BURN:
 - a. Set up prescribed fire signs along Main Park Road and USDA-FS road 32N13.

OFF SITE:

1. ONE WEEK BEFORE BURN:
 - a. Complete necessary pre-work as listed on the Prescribed Fire Checklist.
 - b. Send letter through Superintendent notifying private inholders of prescribed fire.
2. ONE DAY BEFORE BURN:
 - a. Post burn notice signs at the Old Station, Hat Creek Post Office, Loomis Museum, Chalet, Mineral Visitor Center and, both entrance stations.
 - b. Post burn notice signs at Twin Bridges and Big Pine Campgrounds.

3. DAY OF BURN:

- a. Notify private inholders of prescribed fire being conducted adjacent to their property.

SPECIAL PRECAUTIONS/REGULATIONS:

1. Archaeological clearance has been obtained from REDW archaeological staff. Any mitigation measures will be adhered to.
2. An air quality burn permit will be obtained and burn clearance will be coordinated with California Air Resources Board and Shasta County Air Pollution Control.
3. Structure protection for the old inholder's cabin will be established throughout prescribed fire operations.

J. PRESCRIBED FIRE PRESCRIPTION

NFFL (NFDRS) Fuel Models used:	8/9	H, U	65%
& percentage of burn area	8	H	20%
	10	G	15%

PRESCRIPTION

Weather	Range
Temperature (degrees F)	35-85
Relative Humidity (%)	25-85
Wind Direction (Cardinal direction)	N, S, W
Mid-Flame Wind Speed (mph)	0-8, Gusts-12
1-Hour Fuel Moisture (%)	4-8
10-Hour Fuel Moisture (%)	7-14
100-Hour Fuel Moisture (%)	8-20
1000-Hour Fuel Moisture (%)	20-45
Live Woody Fuel Moisture (%)	80-150

FIRE CHARACTERISTICS

Characteristics	Range
Rate of Spread (chains/hour)	.5-35
Flame Length (feet)	.5-10
Scorch Height (feet)	3-55
Fireline Intensity (btu/ft/sec*)	1-956
Spread Component (feet/minute)	4-10
Probability of Ignition (%)	10-50

*NOTE: Firing methods and patterns will be carefully controlled along burn unit boundaries to allow for lower intensities along the fireline.

K. IGNITION AND HOLDING ACTIONS

Burn unit boundaries will be hand ignited with drip torches. The unit interior will either be hand ignited with drip torches or aurally ignited with a Plastic Sphere Dispenser (PSD machine) and helicopter.

The Ignition Specialist will thoroughly describe the firing plan and safety considerations to all burn personnel at the pre-burn briefing. Everyone will be provided a copy of the project map. Firing operations for the entire unit should be completed in 1-3 days.

Test Fire:

A test ignition at the burn site will be conducted to observe flame lengths and rates of spread on the actual day of the burn.

Firing and Ignition:

Blacklining operations near the unit boundaries will be completed with drip torches. Combinations of strip head, flanking, spot, and backing ignition patterns will be used to ignite the unit. Firing patterns and directions could change depending on wind direction and other parameters. If aerial ignition is conducted, the aerial ignition specialist will fly in the helicopter with the PSD machine. Pre-determined ground contacts along portions of the burn unit will be used to help communicate ignition operations with the aerial ignition specialist.

With southerly and westerly winds firing operations will begin along the northeast corner of the unit along the Nobles Emigrant Trail (see project map). Two ignition teams will create a 40-100' wide black line working along the north and east lines. Objectives will be to create a safe and secure black line along the north and east fire lines while slowly adding fire to the interior portions of the unit. Aerial ignition or hand ignition will be used to ignite the interior portions of

the unit. Ground ignition teams will continue creating black lines along the north and east boundaries keeping a 50-100' buffer ahead of the main interior fire. General ignition directions will work from the northeast towards the southwest into the predominant general wind direction. Prevailing winds will determine the ultimate pattern and direction of aerial ignition operations within the burn unit interior.

All ignition specialists will use good care and communication to ensure safety of all personnel around the burn unit. Strip and spot firing patterns utilizing the contour and prevailing winds will be used to create an even backing and/or short strip head fire through the unit. Firing pattern distances may range from 5-80' apart depending on winds and observed fire behavior.

If prescription parameters are exceeded during project execution, ignition operations should be terminated by the Burn Boss at a safe and appropriate location based on fire behavior, fuels, topography and weather conditions. If the project area comes back into prescription based on current and forecasted weather, ignition operations may continue. If not, the project area is put into a mop-up and patrol status. Holding actions shall maintain control of the fire until a decision to continue, postpone or extinguish the prescribed fire is made and the Agency Administrator or their designee is notified. The Burn Boss will document this decision process on a unit log.

Holding Actions:

Roads and firelines surrounding the burn unit will be used as burn unit boundaries for holding operations. Hat Creek, engines, and helicopter with bucket drops, are available as water sources. Hoselays and sprinkler systems may be utilized if deemed necessary by the Holding Group Supervisor or Burn Boss.

- a.) Critical holding areas: Critical holding areas are along the northern boundary of this burn unit (Division B). Portions of Division B are along the park boundary with Lassen National Forest. Heavy fuel concentrations and dense tree thickets within the unit will increase the potential for tree torching and spot fires. The majority of holding resources will be concentrated along this boundary to minimize spread and impacts of any slopovers or spot fires. Forest Service access roads will be utilized to provide access for holding resources to patrol areas north of the burn unit. Northern portions of the unit should also have the highest potential for spot fires due to southwesterly prevailing winds.
- b.) See project map for divisions, Forest Service access roads, water sources, staging areas, etc.

Mop-Up Operations:

Mop-up of part or all of the unit may occur by park personnel if the Burn Boss or Fire Management Officer determines that there is a high potential risk of fire escape outside of the burn unit.

L. WILDLAND FIRE TRANSITION PLAN

- 1. If spot fires or slopovers occur, the Holding Group Supervisor will supervise suppression actions.

2. If spot fires and/or slopovers cannot be controlled within one burning period with on-site resources the Burn Boss will convert the fire to wildland fire status. A Wildland Fire Situation Analysis (WFSA) will be completed. Any suppression actions will be in accordance with the Lassen Volcanic National Park Fire Management Plan.
3. If the is converted to a wildland fire, the Burn Boss will make the declaration and assume the role of Incident Commander until relieved by an Incident Commander Type 3 (ICT3). If the Burn Boss is not a qualified ICT3, prior to ignition of the prescribed fire, one will be available on scene, or be ordered and confirmed to be available on scene within two hours. The Burn Boss will immediately notify Park Dispatch, SIFC, and the Park Superintendent of the change in status to a wildland fire and will order resources through SIFC. SIFC will also notify the Hat Creek Fire Management Officer.
4. All section leaders (Holding, Ignition, Monitoring) will ensure the safety of ALL personnel assigned to them. All personnel will be assigned holding or suppression duties.
5. Water sources (drafting sites, etc.) will be identified on the project map.

M. PROTECTION OF SENSITIVE FEATURES

1. An archaeological clearance will be completed for the proposed project area. Burn operations will be closely monitored by the Burn Boss for compliance with any stated mitigation requirements in the clearance. Currently there are no known archaeological sites within the burn unit.
2. A Resources Management Specialist will review the burn plan and determine if any additional special wildlife management considerations are necessary. All mitigation requirements will be closely monitored and adhered to by the Burn Boss.
3. Structure protection for the old inholders cabin will be conducted throughout burning operations.

N. PUBLIC AND PERSONNEL SAFETY

1. "Prescribed Burn-Do Not Report" signs will be posted along the Main Park Road and USDA-FS 32N12.
2. Assigned burn personnel and/or ranger staff along Main Park Road will conduct traffic control if smoke emissions are impacting driving visibility.
3. A safety briefing will be given at the pre-burn briefing and at the start of each operational period. All personnel will be advised of Lookouts, Communications, Escape Routes, and

Safety Zones. Any other potential safety hazards will be pointed out and mitigated as soon as possible upon identification of hazard.

2. All burn personnel will wear standard firefighting personal protective equipment. They will carry a fire shelter and fire tool at all times.
3. All standard wildland firefighter safety rules will be strictly enforced (ref: Fireline Handbook).
4. Ensure safety of Fire Monitors with Burn Boss and Ignition Specialist and maintain effective communication with ignition and holding teams.

O. SMOKE MANAGEMENT AND AIR QUALITY

1. Smoke columns produced from the prescribed fire may be very large and visible from as far away as Susanville and Redding. However, minimal smoke and/or decreased visibility should impact developed areas due to its remote location. The smoke column should disperse to the northeast with prevailing winds. Communities of Hat Creek and Old Station may experience short duration smoke impacts during ignition operations or nighttime smoke settling down the Hat Creek drainage. "Smoke Ahead" and "Prescribed Fire-Do Not Report" traffic signs will be posted along roads in critical areas. Traffic control will occur by park personnel if visibility poses a safety problem for road traffic.

2. FOFEM or SASEM smoke emission output predictions will be attached to the burn plan. Critical receptor locations are:

Communities of Old Station and Hat Creek	7 miles north
Highway 44	3 miles northwest

3. The Burn Boss and/or Prescribed Fire Specialist will submit a smoke management plan and request for burn permit from Shasta County Air Quality District and will obtain a 48/72-hour decision notice from the California Air Resources Board.
4. The Burn Boss and Prescribed Fire Specialist will monitor compliance with the "Burn Day" regulations. If "No Burn Day" is declared there will be no new ignitions.
5. Smoke emissions and column behavior will be continually monitored and documented on a smoke observation form. Any significant change in smoke emissions and/or column behavior will be reported to the Burn Boss.

P. INTERAGENCY COORDINATION AND PUBLIC NOTIFICATION

1. Fire management staff will prepare a press release at least one week prior to the proposed ignition date. The press release will be sent to all area newspapers, radio, and

television stations at least one day prior to conducting the burn. A general prescribed fire press release outlining all planned prescribed fires at the park will be released at least one to two weeks prior to conducting the first prescribed fire in the park.

2. Fire management staff will prepare a prescribed fire notice with general map identifying the burn location. These notices will be posted at least one day prior to the burn at the following locations: park entrance stations, Loomis museum, park headquarters, Chalet visitor booth, Old Station, Hat Creek, and campgrounds within vicinity of the burn.
3. Fire management staff will notify the following at least one week prior to the proposed ignition date:
 - Park Superintendent
 - Senior Management Staff & District Rangers
 - Shasta County Air Quality Management District
4. Fire management staff will notify the following at least two days prior to the proposed ignition date:
 - Susanville Interagency Fire Center
 - Northeast Air Alliance Members
 - Lassen National Forest
 - Park Staff
 - Regional Office and Northern California NPS fire staff

Q. MONITORING AND EVALUATION PROCEDURES

1. The burn unit contains no permanent fire effects plots. A qualified Fire Monitor (FEMO) will be assigned as Lead Fire Monitor throughout the burn.
2. During the burn, on site monitoring will be conducted by the lead Fire Monitor (FEMO) and/or other assigned Fire Monitors. These people will be responsible for the collection and documentation of weather, smoke, and fire behavior observations according to National Park Service monitoring protocols. They will maintain constant communication with the Burn Boss, Ignition, and Holding Group Supervisors to ensure safe operations when working within the burn.
3. A hygrothermograph with 10-hour fuel sticks and/or Micro RAWS will be set up to measure on site temperature and relative humidity at least one week prior to and throughout the burn.
4. Dead and live fuel samples will be collected and oven dried to validate the fuel moisture prescription within one week prior to the proposed ignition date.
5. Spot weather forecasts will be requested at least two days prior to and each consecutive day of the burn. Actual on site weather information will be reported back to the weather forecaster to help improve the forecasts during the burn.

6. Following the burn, the Lead Fire Monitor will complete a fire monitoring report that summarizes weather and fire behavior observations in relation to ignition operations and any initial observations of first order fire effects. Long term evaluation of how successful the burn was in achieving burn plan goals and objectives will be conducted by park fire staff, the Vegetation Management Specialist, and the Redwood Fire Ecologist.
7. The nearest associated NFDRS/WIMS station is at Manzanita Lake.

R. POST FIRE REHABILITATION

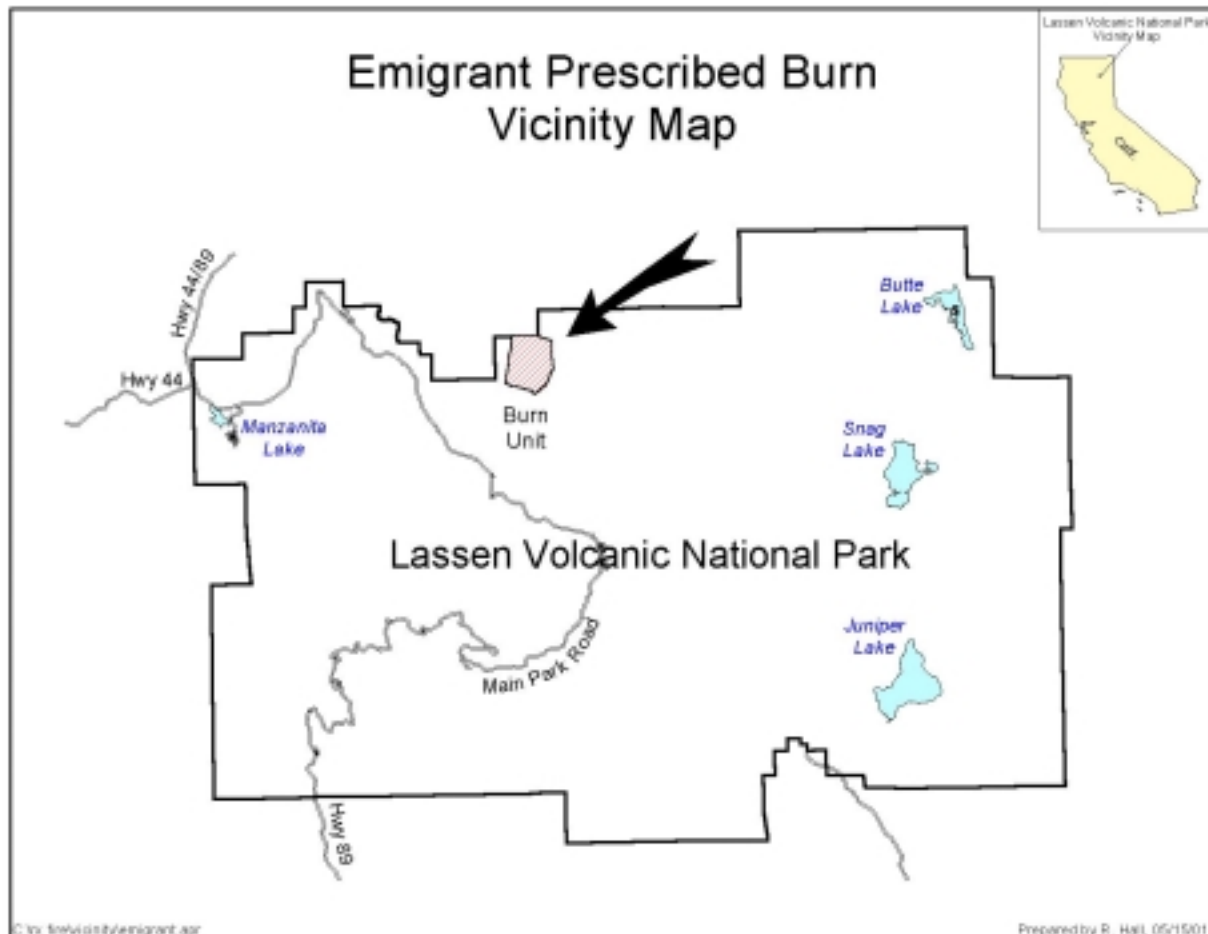
1. Sections of fireline that tie into the Hat Creek Inholders Road may be rehabilitated to avoid future inadvertent trail use by park visitors. Any necessary rehabilitation of temporary firelines will be completed once the Burn Boss has declared the prescribed fire out.

S. POST FIRE REPORTS

1. The Burn Boss will maintain an ICS-214 Unit Log.
2. The Lead Fire Monitor will prepare and submit an individual report that summarizes weather, fire behavior, and smoke observation data within two-weeks after the fire.
3. The Burn Boss will prepare an Individual Fire Report, DI-1202, within ten days after declaring the fire out.
4. The FMO or Prescribed Fire Specialist will prepare a project accomplishment report in the NPS Shared Applications Computer System (SACS).
5. Fire Management staff will maintain a project file that includes the burn unit plan, spot weather forecasts, and all required reports.

T. APPENDICES

Appendix 1: Vicinity Map



Appendix 2: Project Map



Hazard Rating Guide

Hazard Element	Hazard Probability			Potential Consequences		
	L	M	H	L	M	H
1. Environmental Data						
a. Seasonal severity	Energy Release Component below 10-year average level.	Energy Release Component at or above 90 th percentile levels – above average drought conditions.	Energy Release Component at or above 97 th percentile levels – severe drought conditions.	Low probability for problematic fire behavior or difficulty in holding activities.	Some potential for problematic fire behavior or difficulty in holding activities.	High probability for problematic fire behavior and difficulty in control.
b. Fire Behavior	Flame lengths confined to surface fuels, spread rates low.	Flame lengths extending into shrub and tree regeneration, spread rates moderate.	Flame lengths highly variable, frequently involving individual tree crowns, spread rates moderate to fast.	Low probability of difficulty in holding fire or for adverse fire effects.	Some potential for fire behavior to approach upper prescription limits and cause undesirable effects.	High potential for fire behavior to create holding problems, exceed prescription ranges, and cause undesirable effects.
c. Fuels	Surface fuels light with open tree canopies, small shrub component present.	Surface fuels moderate with variable forest stand density and moderate shrub presence.	High surface fuel loading with dense shrub component and dense stands with abundant regeneration.	Fuels present no specific implementation problems.	Fuels will have a marked effect on implementation activities and holding force requirements.	Fuels will dramatically affect management organization and qualifications for implementation.
d. Weather	Weather stable, winds light and predictable, no frontal activity.	Weather slightly variable, winds present but light, occasional gusts, no frontal activity.	Weather highly variable, winds near prescriptive limits, gusts prevalent, frontal activity possible.	Little impact on implementation.	Weather variation will require mitigation actions involving additional resources.	Weather will serve as a major influence on organization, personnel qualifications, and specific implementation actions.
e. Topography	Low variability in slope and aspect.	Some variability in slope and aspect, will affect fuel moisture and fire behavior.	High variability in slope and aspect, major implications on fire behavior and must be considered in prescription development and implementation.	Little influence on burn implementation.	Consideration of topography during planning process is necessary.	Topography will necessitate mitigation actions to be developed and firing patterns and ignition methods to be modified to reduce impacts.

Hazard Element	Hazard Probability			Potential Consequences		
	L	M	H	L	M	H
2. Agency Values						
a. Ecological and Environmental Considerations	Fire poses little threat to cause adverse effects or long-term disturbances to natural resource values. No T and E species or critical habitat.	Fire poses moderate threat of adverse effects on natural resources and may cause short- to mid-term alterations or inconveniences such as air quality. Small amounts of T and E species present.	Fire poses high potential for adverse effects to natural resource values or to cause long-term degradations in air quality. Some T and E species present and/or critical habitat.	Low probability for adverse impacts and little need for mitigation actions.	Mitigation actions may need to be developed to ensure desirable outcomes. Some short-term effects may have to be accepted.	Prescribed Fire Plan must address mitigation actions to prevent undesirable outcomes.
b. Social and Cultural Values	No known social or cultural values in or adjacent to the project area.	Features of social or cultural value have been identified in and adjacent to the project area. Mitigation measures can be accomplished.	High social or cultural values have been identified in or adjacent to the project area. Mitigation actions are difficult to accomplish.	Severe fire behavior or fire outside the unit would not damage the identified values.	Severe fire behavior or fire outside the unit poses potential for moderate damage to special values. Concerned parties are aware and supportive of the project.	Excessive fire severity or fire outside the unit will have adverse effects (substantial damage to or potential destruction of the special sites). Acceptance by concerned parties is low.
c. Project Duration and Logistics	Fire planned to be of short duration, logistical needs easily accommodated.	Fire planned to be of short to moderate duration, logistical needs pose some difficulty.	Fire planned to be of moderate to long duration, logistical needs create much difficulty in accomplishing.	No consequences because of duration or logistics.	Duration may impact firefighters and public and logistical needs must be specifically addressed.	Long duration fire necessitates greater information dissemination, mitigation to remove impacts to firefighters and the public, and logistical needs must be met or project postponed.
d. Smoke and Air Quality Management	Few smoke sensitive areas near project area. No potential scheduling conflicts with cooperators.	Multiple smoke sensitive areas, mitigation actions minimize impacts, low potential for scheduling conflicts.	Multiple smoke sensitive areas near burn area, mitigation actions unable to remove all impacts, duration increases	No adverse smoke consequences.	Mitigation actions must address smoke impacts, and coordination is required to confirm scheduling.	Mitigation actions must be developed, regulatory agencies must concur, scheduling conflicts may restrict

WILDLAND FIRE MANAGEMENT

REFERENCE MANUAL - 18

Exhibit 15 – Sample Prescribed Fire Plan

Chapter 10

Page 74

			impacts, high potential for scheduling conflicts.			implementation.
Hazard Element	Hazard Probability			Potential Consequences		
	L	M	H	L	M	H
3. Public Values						
a. Land use values	No commercial or agriculture activities near planned burn area.	No commercial or agricultural activities near burn unit, some managed wildlands (recreation, timber, range values).	Planned burn in close proximity to urban, commercial, and/or agriculture areas.	No impacts from land use values.	Prescribed Fire Plan must consider actions to prevent fire movement onto commercial and/or agriculture lands.	Mitigation actions must reflect additional resource needs to protect urban, commercial, and/or agriculture areas. If mitigation cannot be accomplished, burn must be postponed.
b. Dwellings	No permanent or part-time residences present in area.	Some part-time residences or outbuildings near burn area.	Planned burn is located in wildland-urban interface zone, permanent residences in close proximity.	No impacts from dwellings.	Plan must address actions to ensure adequate protection of residences.	Notification of all concerned homeowners, residents, and visitors, coordination with local fire protection organizations is needed, and mitigation actions must adequately address potential fire escapes.
c. Non-dwellings	No non-dwellings present.	Some outbuildings and non-residences near burn area.	Commercial structures in close proximity to burn area.	No impacts.	Planning must consider these non-dwellings.	Planning and implementation must adequately address all measures to prevent any adverse impacts.

Hazard Element	Hazard Probability			Potential Consequences		
	L	M	H	L	M	H
4. Human Factors						
a. Firefighter	Little firefighter exposure.	Some firefighter exposure due to fire duration and smoke.	Potential for high firefighter exposure to smoke during burn and to fire during holding actions.	No specific problems, implement standard safety measures.	Mitigation measures to eliminate smoke exposure.	Mitigation measures must address smoke exposure, use of mechanized equipment to eliminate exposure to fire.
b. Public	No public exposure.	Some public exposure, mitigation actions can remove/minimize exposure.	Public may be exposed to high smoke concentrations for moderately long periods, especially during nighttime hours.	No adverse consequences anticipated.	Mitigation actions necessary to provide for maximum public safety.	Mitigation actions must be developed, coordinated with other emergency organizations and fully understood prior to ignition.
c. Fire Management	No problems with commitment and acceptance by park staff members.	No problems with commitment but some unwillingness to support and prioritize the prescribed fire over other activities.	Park staff not committed to using prescribed fire as a tool and not willing to support and prioritize prescribed fire over other activities.	No adverse consequences.	Park staff must be briefed on need and importance of prescribed fire.	Park management team must be informed of prescribed fire objectives, support needs, and priority.

PRESCRIBED FIRE RISK ANALYSIS WORKSHEET

Hazard Element	Hazard Probability			Potential Consequences			*Risk (Exhibit 4)
	L	M	H	L	M	H	
1. Environmental Data							
a. Seasonal severity	X				X		M
b. Fire Behavior		X				X	H
c. Fuels		X				X	H
d. Weather	X				X		M
e. Topography		X				X	H
2. Agency Values							
a. Ecological and Environmental Considerations	X				X		M
b. Social and Cultural Values		X			X		M
c. Project Duration and Logistics		X			X		M
d. Smoke and Air Quality Management		X				X	H
3. Public Values							
a. Land use values	X			X			L
b. Dwellings	X			X			L
c. Non-dwellings	X			X			L
4. Human Factors							
a. Firefighter		X			X		M
b. Public		X				X	H
c. Fire Management	X			X			L

RATIONALE & MITIGATIONS: (Record below or on additional sheets)

***NOTE:** Risk is determined using the Risk – Assessment Matrix (Exhibit 4) by finding the intersection between the hazard probability and the potential consequence and entering the value as the “Risk” for that element.

Mitigations and controls to be taken will be identified and documented for each element defined above the Low Risk Level in the Prescribed Fire Risk Mitigation Table (Exhibit 5) and in the various applicable elements in the Prescribed Fire Plan. The highest risk value will be carried forward to the Prescribed Fire Complexity Rating Guide (Exhibit 6) as a reminder of those hazard elements requiring mitigation.

PRESCRIBED FIRE RISK MITIGATION TABLE

Hazard Element	Risk	Mitigations / Controls	Residual Risk	Reference:
		Briefly explain what actions will be taken relative to each hazard element that will reduce the risk.		In Prescribed Fire Plan
1. Environmental Data				
a. Seasonal Severity	M	The ignition methods will be adjusted to reflect the time of year, day, fuel, and weather conditions.	L	F. Organization, K. Ignition and Holding Actions
b. Fire Behavior	H	Firing patterns and directions will change depending on wind direction and fire behavior.	M	K. Ignition and Holding Actions – Firing and Ignition
c. Fuels	H	Ladder fuels within one (1) chain of the control line will be removed 6-8 feet above the ground prior to ignition to reduce the potential of torching and crowning adjacent to the line.	M	I. Pre-burn considerations – line preparation
d. Weather	M	Firing patterns and ignition times will be dependent upon the weather meeting prescription parameters. If weather exceeds prescription parameters, the burn will not be implemented.	L	K. Ignition and Holding Actions – Test Fire, Firing and Ignition
e. Topography	H	Firing patterns and ignition techniques will take advantage of the topography to maintain safety and achieve the objectives.	L	K. Ignition and Holding Actions – Firing and Ignition
2. Agency Values				
a. Ecological and environmental considerations	M	The range of acceptable results expected across the project area has been defined and implementation actions designed to achieve this range.	L	Range of Acceptable Results Expected Across the Project Area; K. Ignition and Holding Actions

WILDLAND FIRE MANAGEMENT

REFERENCE MANUAL - 18

Exhibit 15 – Sample Prescribed Fire Plan

Chapter 10

Page 78

Hazard Element	Risk	Mitigations / Controls	Residual Risk	Reference:
		Briefly explain what actions will be taken relative to each hazard element that will reduce the risk.		In Prescribed Fire Plan
b. Social and Cultural values	M	An archaeological clearance will be completed for the proposed project area. Burn operations will be closely monitored by the Burn Boss for compliance with any stated mitigation requirements in the clearance. Currently there are no known archaeological sites within the burn unit. A Resources Management Specialist will review the burn plan and determine if any additional special wildlife management considerations are necessary. All mitigation requirements will be closely monitored and adhered to by the Burn Boss. Structure protection for the old inholders cabin will be conducted throughout burning operations.	L	M. Protection of Sensitive Features
c. Project duration and logistics	M	Duration is planned for the minimum needed to safely accomplish the objectives. Logistical concerns are planned for in the plan.	L	F. Organization; G. Estimated Project Costs; H. Scheduling; I. Pre-Burn Considerations
d. Smoke and Air Quality Management	H	Smoke columns produced from the prescribed fire may be very large and visible from as far away as Susanville and Redding. However, minimal smoke and/or decreased visibility should impact developed areas due to its remote location. The smoke column should disperse to the northeast with prevailing winds. Communities of Hat Creek and Old Station may experience short duration smoke impacts during ignition operations or nighttime smoke settling down the Hat Creek drainage. "Smoke Ahead" and "Prescribed Fire-Do Not Report" traffic signs will be posted along roads in critical areas. Traffic control will occur by park personnel if visibility poses a safety problem for road traffic. FOFEM or SASEM smoke emission output predictions will be attached to the burn plan. Critical receptor locations are: Communities of Old Station and Hat Creek 7 miles north Highway 44 3 miles northwest The Burn Boss and/or Prescribed Fire Specialist will submit a smoke management plan and request for burn permit from Shasta County Air Quality District and will obtain a 48/72-hour decision notice from the California Air Resources Board. (continued on next page)	L	O. Smoke Management and Air Quality

WILDLAND FIRE MANAGEMENT

REFERENCE MANUAL - 18

Exhibit 15 – Sample Prescribed Fire Plan

Chapter 10

Page 79

		The Burn Boss and Prescribed Fire Specialist will monitor compliance with the "Burn Day" regulations. If "No Burn Day" is declared there will be no new ignitions. Smoke emissions and column behavior will be continually monitored and documented on a smoke observation form. Any significant change in smoke emissions and/or column behavior will be reported to the Burn Boss.		
Hazard Element	Risk	Mitigations / Controls	Residual Risk	Reference:
		Briefly explain what actions will be taken relative to each hazard element that will reduce the risk.		In Prescribed Fire Plan
3. Public Values				
a. Land use values	L	-----	-----	-----
b. Dwellings	L	-----	-----	-----
c. Non-dwellings	L	-----	-----	-----
4. Human Factors				
a. Firefighter	M	Assigned burn personnel and/or ranger staff along Main Park Road will conduct traffic control if smoke emissions are impacting driving visibility. A safety briefing will be given at the pre-burn briefing and at the start of each operational period. All personnel will be advised of Lookouts, Communications, Escape Routes, and Safety Zones. Any other potential safety hazards will be pointed out and mitigated as soon as possible upon identification of hazard. All burn personnel will wear standard firefighting personal protective equipment. They will carry a fire shelter and fire tool at all times. All standard wildland firefighter safety rules will be strictly enforced (ref: Fireline Handbook).	L	K. Ignition and Holding Actions – Test Fire N. Public and Personnel Safety, Job Hazard Analysis
b. Public	H	"Prescribed Burn-Do Not Report" signs will be posted along the Main Park Road and USDA-FS 32N12. Traffic control will occur by park personnel if visibility poses a safety problem for road traffic.	M	N. Public and Personnel Safety O. Smoke Management and Air Quality
c. Fire Management	L	-----	-----	-----

Appendix 3: Prescribed Fire Complexity Rating Worksheet w/Aerial Ignition

Complexity Element		Complexity Value		
		L	M	H
Primary Factors	1. Life and Safety		X	
	2. Threats to Boundaries			X
	3. Management Organization			X
	4. Political Concerns	X		
	<i>SUBTOTAL OF PRIMARY FACTORS</i>	1	1	2
Secondary Factors	5. Objectives		X	
	6. Fuels and Fire Behavior		X	
	7. Air Quality Values		X	
	8. Improvements	X		
	9. Logistics		X	
	10. Natural, Cultural and Social Values		X	
	11. Tactical Operations			X
	12. Interagency Coordination		X	
	<i>SUBTOTAL OF SECONDARY FACTORS</i>	1	6	1
TOTAL COUNT OF COMPLEXITY VALUES		2	7	3

QUALIFICATIONS DETERMINATION TABLE:

	Prescribed Fire Burn Boss Type 2 (RXB2)	Prescribed Fire Burn Boss Type 1 (RXB1)
Primary Factors rated "H"	Less than 2	2 or more
	AND	OR
Total Count rated "H"	Less than 4	4 or more
		OR
	Minimum required on all prescribed fires.	When deemed appropriate by the agency administrator or unit Fire Management Officer.
Prescribed Fire Burn Boss Level Indicated (check one):		RXB1 XXXX RXB2

PREPARED BY: /s/ John Park

DATE: August 15, XXXX

APPROVAL BY: /s/ Sheila Jones
Agency Administrator

DATE: September 1, XXXX

REVIEWED BY: _____
(Burn Boss immediately prior to burning)

DATE: _____

Appendix 4: Prescribed Fire Complexity Rating Worksheet w/o Aerial Ignition

Complexity Element		Complexity Value		
		L	M	H
Primary Factors	1. Life and Safety		X	
	2. Threats to Boundaries			X
	3. Management Organization		X	
	4. Political Concerns	X		
	<i>SUBTOTAL OF PRIMARY FACTORS</i>	1	2	1
Secondary Factors	5. Objectives		X	
	6. Fuels and Fire Behavior		X	
	7. Air Quality Values		X	
	8. Improvements	X		
	9. Logistics		X	
	10. Natural, Cultural and Social Values		X	
	11. Tactical Operations			X
	12. Interagency Coordination		X	
	<i>SUBTOTAL OF SECONDARY FACTORS</i>	1	6	1
TOTAL COUNT OF COMPLEXITY VALUES		2	8	2

QUALIFICATIONS DETERMINATION TABLE:

	Prescribed Fire Burn Boss Type 2 (RXB2)	Prescribed Fire Burn Boss Type 1 (RXB1)
Primary Factors rated "H"	Less than 2	2 or more
	AND	OR
Total Count rated "H"	Less than 4	4 or more
		OR
	Minimum required on all prescribed fires.	When deemed appropriate by the agency administrator or unit Fire Management Officer.
Prescribed Fire Burn Boss Level Indicated (check one):		RXB1 <input type="checkbox"/> RXB2 <input type="checkbox"/> XXXX <input type="checkbox"/>

PREPARED BY: /s/ John Park

DATE: August 15, XXXX

APPROVAL BY: /s/ Sheila Jones
Agency Administrator

DATE: September 1, XXXX

REVIEWED BY: _____
(Burn Boss immediately prior to burning)

DATE: _____

WILDLAND FIRE MANAGEMENT
REFERENCE MANUAL – 18
Exhibit 15 Sample Prescribed Fire Plan

Chapter 10
Page 82

Appendix 5: Fire Modeling Outputs

BEHAVE BURN SUBSYSTEM
FIRE1 PROGRAM: VERSION 4.4 -- FEBRUARY 1997

Moist/Calm Conditions

```
1--FUEL MODEL ----- 8 -- CLOSED TIMBER LITTER
2--1-HR FUEL MOISTURE, % -- 8.0
3--10-HR FUEL MOISTURE, % - 14.0
4--100-HR FUEL MOISTURE, % 20.0
7--MIDFLAME WINDSPEED, MI/H .0
8--TERRAIN SLOPE, % ----- .0
9--DIRECTION OF WIND VECTOR .0
10--DIRECTION OF SPREAD ---- .0 (DIRECTION OF MAX SPREAD)
  CALCULATIONS
    RATE OF SPREAD, CH/H ----- 0.
    HEAT PER UNIT AREA, BTU/SQFT -- 171.
    FIRELINE INTENSITY, BTU/FT/S--- 1.
    FLAME LENGTH, FT----- .4
    REACTION INTENSITY, BTU/SQFT/M 844.
    EFFECTIVE WINDSPEED, MI/H----- .0

1--FUEL MODEL ----- 10 -- TIMBER (LITTER AND UNDERSTORY)
2--1-HR FUEL MOISTURE, % -- 8.0
3--10-HR FUEL MOISTURE, % - 14.0
4--100-HR FUEL MOISTURE, % 20.0
6--LIVE WOODY MOISTURE, % - 150.0
7--MIDFLAME WINDSPEED, MI/H .0
8--TERRAIN SLOPE, % ----- .0
9--DIRECTION OF WIND VECTOR .0
10--DIRECTION OF SPREAD ---- .0 (DIRECTION OF MAX SPREAD)
  CALCULATIONS
    RATE OF SPREAD, CH/H ----- 1.
    HEAT PER UNIT AREA, BTU/SQFT -- 1142.
    FIRELINE INTENSITY, BTU/FT/S--- 11.
    FLAME LENGTH, FT----- 1.4
    REACTION INTENSITY, BTU/SQFT/M 5247.
    EFFECTIVE WINDSPEED, MI/H----- .0

1--TWO FUEL MODEL CONCEPT - 60% 8 -- CLOSED TIMBER LITTER
                                40% 9 -- HARDWOOD LITTER
2--1-HR FUEL MOISTURE, % -- 8.0
3--10-HR FUEL MOISTURE, % - 14.0
4--100-HR FUEL MOISTURE, % 20.0
7--MIDFLAME WINDSPEED, MI/H .0
8--TERRAIN SLOPE, % ----- .0
9--DIRECTION OF WIND VECTOR .0
10--DIRECTION OF SPREAD ---- .0 (DIRECTION OF MAX SPREAD)
  CALCULATIONS
FUEL MODEL 8 (60%)
    RATE OF SPREAD, CH/H ----- 0.
    HEAT PER UNIT AREA, BTU/SQFT -- 171.
    FIRELINE INTENSITY, BTU/FT/S--- 1.
```

WILDLAND FIRE MANAGEMENT
REFERENCE MANUAL – 18
Exhibit 15 Sample Prescribed Fire Plan

Chapter 10
Page 83

```

FLAME LENGTH, FT----- .4
REACTION INTENSITY, BTU/SQFT/M      844.
EFFECTIVE WINDSPEED, MI/H----- .0
FUEL MODEL  9   (40%)
RATE OF SPREAD, CH/H ----- 1.
HEAT PER UNIT AREA, BTU/SQFT -- 343.
FIRELINE INTENSITY, BTU/FT/S--- 5.
FLAME LENGTH, FT----- .9
REACTION INTENSITY, BTU/SQFT/M      2219.
EFFECTIVE WINDSPEED, MI/H----- .0
FUEL MODEL  8   (60%)      FUEL MODEL  9   (40%)
WEIGHTED RATE OF SPREAD, CH/H-- 0.

```

Warm/Breeze Conditions

```

1--FUEL MODEL ----- 10 -- TIMBER (LITTER AND UNDERSTORY)
2--1-HR FUEL MOISTURE, % -- 4.0
3--10-HR FUEL MOISTURE, % - 7.0
4--100-HR FUEL MOISTURE, % 8.0
6--LIVE WOODY MOISTURE, % - 80.0
7--MIDFLAME WINDSPEED, MI/H 8.0
8--TERRAIN SLOPE, % ----- .0 30.0
9--DIRECTION OF WIND VECTOR .0
    DEGREES CLOCKWISE
    FROM UPHILL
10--DIRECTION OF SPREAD ---- .0 (DIRECTION OF MAX SPREAD)
    CALCULATIONS

```

TERRAIN SLOPE (%)	I I I	RATE OF SPREAD (CH/H)	HEAT PER UNIT AREA (BTU/SQFT)	FIRELINE INTENSITY (BTU/FT/S)	FLAME LENGTH (FT)	REACTION INTENSITY (BTU/SQFT/M)	EFFECT. WIND (MI/H)
.0	I	20.	1410.	523.	8.0	6477.	8.0
30.0	I	22.	1410.	565.	8.3	6477.	8.5

SIZE-LINKED-TO-DIRECT

```

1--RATE OF SPREAD, CH/H --- OUTPUT FROM DIRECT. RANGE= 20. TO 22.
2--EFFECTIVE WIND, CH/H --- OUTPUT FROM DIRECT. RANGE= 8.0 TO 8.5
3--ELAPSED TIME, HR ----- .5

```

TERRAIN SLOPE (%)	I I I	AREA (AC)	PERIMETER (CH)	LENGTH- TO-WIDTH RATIO	FORWARD SPREAD DISTANCE (CH)	BACKING SPREAD DISTANCE (CH)	MAXIMUM WIDTH OF FIRE (CH)
.0	I	2.8	23.	3.0	10.1	.3	3.5
30.0	I	3.2	25.	3.1	10.9	.3	3.6

CONTAIN-LINKED-TO-DIRECT-AND-SIZE

```

1--RUN OPTION ----- 1.=COMPUTE LINE BUILDING RATE
2--MODE OF ATTACK ----- 2.=REAR

```

WILDLAND FIRE MANAGEMENT
REFERENCE MANUAL – 18
Exhibit 15 Sample Prescribed Fire Plan

Chapter 10
Page 84

3--RATE OF SPREAD, CH/H ---	OUTPUT FROM DIRECT. RANGE=	20. TO	22.
4--INITIAL FIRE SIZE, AC --	OUTPUT FROM SIZE. RANGE=	3. TO	3.
5--LENGTH-TO-WIDTH RATIO --	OUTPUT FROM SIZE. RANGE=	3.0 TO	3.1
6--BURNED AREA TARGET, AC -	50.0		

TERRAIN	I	TOTAL	CONTAINMENT	TOTAL
SLOPE	I	LENGTH	TIME	LINE BLDG
	I	OF LINE		RATE
(%)	I	(CH)	(HOURS)	(CH/H)
	I			
	I			
.0	I	146.#	3.0#	48.#
	I			
30.0	I	146.#	2.8#	53.#

= CONTROL EFFORTS AT THE HEAD OF THE FIRE
WILL PROBABLY BE INEFFECTIVE.

High Wind Gusts

1--FUEL MODEL -----	10 --	TIMBER (LITTER AND UNDERSTORY)
2--1-HR FUEL MOISTURE, % --	4.0	
3--10-HR FUEL MOISTURE, % -	7.0	
4--100-HR FUEL MOISTURE, %	8.0	
6--LIVE WOODY MOISTURE, % -	80.0	
7--MIDFLAME WINDSPEED, MI/H	12.0	
8--TERRAIN SLOPE, % -----	.0	10.0 20.0 30.0 40.0
9--DIRECTION OF WIND VECTOR	.0	
DEGREES CLOCKWISE		
FROM UPHILL		
10--DIRECTION OF SPREAD ----	.0	(DIRECTION OF MAX SPREAD)
CALCULATIONS		

TERRAIN	I	RATE OF	HEAT PER	FIRELINE	FLAME	REACTION	EFFECT.
SLOPE	I	SPREAD	UNIT AREA	INTENSITY	LENGTH	INTENSITY	WIND
	I						
(%)	I	(CH/H)	(BTU/SQFT)	(BTU/FT/S)	(FT)	(BTU/SQFT/M)	(MI/H)
	I						
.0	I	35.	1410.	914.	10.4	6477.	12.0
	I						
30.0	I	37.	1410.	956.	10.6	6477.	12.4

SIZE-LINKED-TO-DIRECT

1--RATE OF SPREAD, CH/H ---	OUTPUT FROM DIRECT. RANGE=	35. TO	38.
2--EFFECTIVE WIND, CH/H ---	OUTPUT FROM DIRECT. RANGE=	12.0 TO	12.7
3--ELAPSED TIME, HR -----	.5		

TERRAIN	I	AREA	PERIMETER	LENGTH-	FORWARD	BACKING	MAXIMUM
SLOPE	I			TO-WIDTH	SPREAD	SPREAD	WIDTH
	I			RATIO	DISTANCE	DISTANCE	OF FIRE
(%)	I	(AC)	(CH)		(CH)	(CH)	(CH)
	I						
.0	I	6.3	39.	4.0	17.7	.3	4.5
	I						
30.0	I	6.8	40.	4.1	18.5	.3	4.6

WILDLAND FIRE MANAGEMENT
REFERENCE MANUAL – 18
Exhibit 15 Sample Prescribed Fire Plan

Chapter 10
Page 85

CONTAIN-LINKED-TO-DIRECT-AND-SIZE

1--RUN OPTION -----	1.=COMPUTE LINE BUILDING RATE		
2--MODE OF ATTACK -----	2.=REAR		
3--RATE OF SPREAD, CH/H ---	OUTPUT FROM DIRECT. RANGE=	35. TO	38.
4--INITIAL FIRE SIZE, AC --	OUTPUT FROM SIZE. RANGE=	6. TO	7.
5--LENGTH-TO-WIDTH RATIO --	OUTPUT FROM SIZE. RANGE=	4.0 TO	4.2
6--BURNED AREA TARGET, AC -	50.0		

TERRAIN	I	TOTAL	CONTAINMENT	TOTAL
SLOPE	I	LENGTH	TIME	LINE BLDG
(%)	I	OF LINE		RATE
	I	(CH)	(HOURS)	(CH/H)
	I			
	I			
.0	I	149.#	1.6#	95.#
	I			
30.0	I	150.#	1.5#	101.#

= CONTROL EFFORTS AT THE HEAD OF THE FIRE
WILL PROBABLY BE INEFFECTIVE.

SCORCH-LINKED-TO-DIRECT

1--AMBIENT AIR TEMP, F ----	72.0		
2--FLAME LENGTH, FT -----	OUTPUT FROM DIRECT. RANGE =	10.4 TO	10.7
3--MIDFLAME WINDSPEED, MI/H	SAVED FROM DIRECT =	12.0	

TERRAIN	I	CROWN
SLOPE	I	SCORCH
(%)	I	HEIGHT
	I	(FT)
	I	
.0	I	51.
	I	
30.0	I	54.

**Appendix 6: ADEQUATE HOLDING RESOURCES WORKSHEET w/Aerial Ignition
FOR PRESCRIBED FIRE**

Project Name: Emigrant Fuel Models Inside Project Area: 8, 9, 10
Prepared By/Date: /s/ John Park Fuel Models Outside Project Area: 8, 10

Characteristics	Output type	Modeling Predictions Inside Project Area	Modeling Predictions Outside Project Area	Unit of Measure
CRITICAL FIRE INPUTS	1 Hr Fuel Moisture	4	4	%
	Wind Speed	8	8	MPH
	Slope	0	30	%
KEY FIRE BEHAVIOR OUTPUTS	Rate of Spread (ROS)	20	22	ch/hr
	Fireline Intensity	523	565	BTU/ft/sec
	Flame Length	8	8	Feet
	Probability of Ignition	50	50	%
	Spotting Distance			Miles
	Scorch Height	50	55	Feet
FIRE SIZE	Projection Time	0.5	0.5	Hours
	Forward Spread	10	11	Chains
	Backward Spread	0.3	0.3	Chains
FIRE CONTAINMENT	Method Of Attack	Rear	Rear	Head/Rear
	Max Escape Target	50	50	Acres
	Max Containment Time	3	3	Hours
	Total Line Building Rate	48	53	Ch/hr
1. Choose greater total line building rate from inside and outside the project area		53		Ch/hr
2. Estimate potential number spot fires or slopovers at one time:			1	
3. TOTAL LINE BUILDING RATE NEEDED (multiply line 1 times line 2)			53	Ch/hr

Production Rates: Ease of Access: POOR-FAIR-**GOOD**-EXCELLENT (circle)
(refer to fireline handbook other sources and local knowledge)

On Site Organization	Total # Planned On Burn	Total # Dedicated to Prescribed Fire	Total # Available for Spot Fire or Slopover Control		Line Building Production Rates		Spot Fire or Slopover Line Building Capacity
Overhead	8	5	3	X	0	ch/hr	0
Firing Crew				X		ch/hr	
Holding	60	20	40	X	1	ch/hr	40
Other Personnel				X		ch/hr	
Engine (Crew of 4)	8	4	4	X	4	ch/hr	16
Dozer (Size)				X		ch/hr	
Other	4	2	2	X		ch/hr	
Other				X		ch/hr	
Other				X		ch/hr	
4. TOTAL CAPACITY	80	31	49			ch/hr	56
3. TOTAL LINE BUILDING RATE NEEDED (from table above)						ch/hr	53
5. DETERMINATION OF ADEQUATE HOLDING RESOURCES (Line 4 minus Line 3)						ch/hr	3

If number on line 5 is positive then adequate holding forces will be available. If number is negative, more holding resources are needed.

**Appendix 7: ADEQUATE HOLDING RESOURCES WORKSHEET w/o Aerial Ignition
FOR PRESCRIBED FIRE**

Project Name: Emigrant Fuel Models Inside Project Area: 8, 9, 10
Prepared By/Date: /s/ John Park Fuel Models Outside Project Area: 8, 10

Characteristics	Output type	Modeling Predictions Inside Project Area	Modeling Predictions Outside Project Area	Unit of Measure
CRITICAL FIRE INPUTS	1 Hr Fuel Moisture	4	4	%
	Wind Speed	8	8	MPH
	Slope	0	30	%
KEY FIRE BEHAVIOR OUTPUTS	Rate of Spread (ROS)	20	22	ch/hr
	Fireline Intensity	523	565	BTU/ft/sec
	Flame Length	8	8	Feet
	Probability of Ignition	50	50	%
	Spotting Distance			Miles
	Scorch Height	50	55	Feet
FIRE SIZE	Projection Time	0.5	0.5	Hours
	Forward Spread	10	11	Chains
	Backward Spread	0.3	0.3	Chains
FIRE CONTAINMENT	Method Of Attack	Rear	Rear	Head/Rear
	Max Escape Target	50	50	Acres
	Max Containment Time	3	3	Hours
	Total Line Building Rate	48	53	Ch/hr
1. Choose greater total line building rate from inside and outside the project area		53		Ch/hr
2. Estimate potential number spot fires or slopovers at one time:			2	
3. TOTAL LINE BUILDING RATE NEEDED (multiply line 1 times line 2)			106	Ch/hr

Production Rates: Ease of Access: POOR-FAIR-**GOOD**-EXCELLENT (circle)
(refer to fireline handbook other sources and local knowledge)

On Site Organization	Total # Planned On Burn	Total # Dedicated to Prescribed Fire	Total # Available for Spot Fire or Slopover Control		Line Building Production Rates		Spot Fire or Slopover Line Building Capacity
Overhead	7	5	2	X	0	ch/hr	0
Firing Crew	20	20		X		ch/hr	
Holding	80		80	X	1	ch/hr	80
Other Personnel				X		ch/hr	
Engine (Crew of 4)	12	4	8	X	4	ch/hr	32
Dozer (Size)				X		ch/hr	
Other				X		ch/hr	
Other				X		ch/hr	
Other				X		ch/hr	
4. TOTAL CAPACITY	119	29	90				112
3. TOTAL LINE BUILDING RATE NEEDED (from table above)						ch/hr	106
5. DETERMINATION OF ADEQUATE HOLDING RESOURCES (Line 4 minus Line 3)						ch/hr	6

If number on line 5 is positive then adequate holding forces will be available. If number is negative, more holding resources are needed.

**Appendix 8: ADEQUATE HOLDING RESOURCES WORKSHEET– Partial Operation
FOR PRESCRIBED FIRE**

Project Name: Emigrant Fuel Models Inside Project Area: 8, 9, 10
Prepared By/Date: /s/ John Park Fuel Models Outside Project Area: 8, 10

Characteristics	Output type	Modeling Predictions Inside Project Area	Modeling Predictions Outside Project Area	Unit of Measure
CRITICAL FIRE INPUTS	1 Hr Fuel Moisture	4	4	%
	Wind Speed	8	8	MPH
	Slope	0	30	%
KEY FIRE BEHAVIOR OUTPUTS	Rate of Spread (ROS)	20	22	ch/hr
	Fireline Intensity	523	565	BTU/ft/sec
	Flame Length	8	8	Feet
	Probability of Ignition	50	50	%
	Spotting Distance			Miles
	Scorch Height	50	55	Feet
FIRE SIZE	Projection Time	0.5	0.5	Hours
	Forward Spread	10	11	Chains
	Backward Spread	0.3	0.3	Chains
FIRE CONTAINMENT	Method Of Attack	Rear	Rear	Head/Rear
	Max Escape Target	50	50	Acres
	Max Containment Time	3	3	Hours
	Total Line Building Rate	48	53	Ch/hr
1. Choose greater total line building rate from inside and outside the project area		53		Ch/hr
2. Estimate potential number spot fires or slopovers at one time:			1	
3. TOTAL LINE BUILDING RATE NEEDED (multiply line 1 times line 2)			53	Ch/hr

Production Rates: Ease of Access: POOR-FAIR-**GOOD**-EXCELLENT (circle)
(refer to fireline handbook other sources and local knowledge)

On Site Organization	Total # Planned On Burn	Total # Dedicated to Prescribed Fire	Total # Available for Spot Fire or Slopover Control		Line Building Production Rates		Spot Fire or Slopover Line Building Capacity
Overhead	4	2	2	X	0	ch/hr	0
Firing Crew	6	6		X		ch/hr	
Holding	12		12	X	1	ch/hr	12
Other Personnel				X		ch/hr	
Engine (Crew of 4)	4		4	X	4	ch/hr	16
Dozer (Size)				X		ch/hr	
Other	40		40	X	1	ch/hr	40
Other				X		ch/hr	
Other				X		ch/hr	
4. TOTAL CAPACITY	66	8	58				68
3. TOTAL LINE BUILDING RATE NEEDED (from table above)						ch/hr	53
5. DETERMINATION OF ADEQUATE HOLDING RESOURCES (Line 4 minus Line 3)						ch/hr	15

If number on line 5 is positive then adequate holding forces will be available. If number is negative, more holding resources are needed.

Appendix 9:

**AGENCY ADMINISTRATOR
GO/NO-GO PRE-IGNITION APPROVAL**

Prescribed Fire Name: Emigrant

Date: August 29th, XXXX

Instructions

The Agency Administrator's Go/No-Go Pre-Ignition Approval is the first of two GO/NO-GO decisions that must be completed before a prescribed fire can be implemented. The Agency Administrator's Go/No-Go Pre-Ignition Approval is the final management approval prior to execution of the prescribed fire and evaluates whether compliance requirements, prescribed fire plan elements, and internal and external notifications have been completed. The Agency Administrator's Go/No-Go Pre-Ignition Approval is valid for 30 days. If ignition of the prescribed fire is not initiated prior to expiration date determined by the Agency Administrator, a new approval will be required.

Key Elements

1. Is the prescribed fire plan up to date?

Hints: changes, amendments, seasonality.

Yes, the prescribed fire plan was completed within the last two weeks and is valid for current conditions.

2. Have all compliance requirements been completed?

Hints: cultural, threatened and endangered species, smoke management.

Yes, all compliance requirements are up to date and completed.

3. Is risk management in place and the residual risk acceptable?

Hints: Prescribed Fire Mitigation Table and Prescribed Fire Complexity Rating Guide completed with rationale and mitigations identified.

Yes, the risk management process has accounted for and controlled risk to a level acceptable to the agency administrator.

4. Will all elements of the prescribed fire plan be met?

Hint: preparation work, mitigation, weather, organization, prescription.

Yes, all prescribed fire plan elements can and will be met or the fire will be postponed (as determined by the Prescribed Fire Operations GO/NO-GO Checklist).

5. Have all internal and external notifications and media releases been completed?

Yes, all notifications have been completed and documented.

6. Are key park staff fully briefed, and understand the implementation of the prescribed fire?

Yes, all park staff members have been informed of the prescribed fire and staff leaders have been briefed on the objectives and implementation actions at park staff meetings. I am available for any additional questions.

7. Other?

None

Recommended by /s/ Clark Kent Date August 29th, XXXX
FMO/Burn Boss

Approved by /s/ Sheila Jones Date September 1st, XXXX
Park Superintendent

Approval expires: September 30th, XXXX (May not be more than 30 days after approved date.)
Date

Appendix 10:

Prescribed Fire Operations
Go/No Go Checklist

Prescribed Fire Name: Emigrant

Date:

	YES	NO
- Has Agency Administrator Go/No-Go Approval been completed?		
Narrative/Comments:		
- Are current and forecasted weather conditions favorable for execution of the prescribed fire? (hints: spot weather, dialogue with fire weather forecaster, climatological analysis complete)		
Narrative/Comments:		
- Have all key personnel listed on the Incident Action Plan (IAP) been briefed with an opportunity to give feedback? (hints: safety, objectives, assignments)		
Narrative/Comments:		
- Has all pre-burn preparedness work been completed? (hints: fuels and weather observations, signs, closures, smoke management, unit preparation)		
Narrative/Comments:		
- Are all equipment and supplies required in the prescribed fire plan in place and functional? (hints: pumps, radios, ignition devices, hose lays, vehicles, aviation, etc.)		
Narrative/Comments:		
- Are all holding resources described in the IAP committed and can be on-scene within specified time frames?		
Narrative/Comments:		
- Are all personnel certified for their assigned positions? (hints: Check Red Cards)		
Narrative/Comments:		

	YES	NO
- There are no extenuating circumstances that preclude successful completion of this project? (hints: regional & national preparedness, unusual circumstances, unusual drought, outstanding issues, other fires, recent fire escapes, etc.)		
Narrative/Comments:		
IF ALL BOXES HAVE BEEN CHECKED "YES" YOU MAY PROCEED WITH THE TEST FIRE.		
TEST FIRE DOCUMENTATION AND RESULTS:		
- Observed Fire Behavior within Prescription?		
Narrative/Comments:		
- Test fire was successful?		
Narrative/Comments:		
- Are all prescription parameters in the prescribed fire plan favorable for implementing the project? (hints: each plan element, pre-burn, smoke management, coordinator coordination)		
Narrative/Comments:		
IF LAST 3 BOXES ARE ALL "YES", YOU MAY PROCEED WITH PRESCRIBED FIRE.		

Signatures

<u>RX BURN BOSS:</u>	<u>IGNITION SPECIALIST:</u>
<u>HOLDING OPERATIONS:</u>	<u>DATE:</u>

Appendix 11: Checklist of Pre-Burn Prescribed Fire Activities

EMIGRANT
CHECKLIST OF PRE-BURN PRESCRIBED FIRE ACTIVITIES

BURN PLAN ADDITIONS	Comments	By/When
FIRE COMPLEXITY WORKSHEET		
VICINITY MAP		
PROJECT MAP		
FIRING MAP/AERIAL HAZARD MAP		
BEHAVE/FOFEM/SASEM FIRE & SMOKE PREDICTIONS		
ARCHAEOLOGICAL /CULTURAL CLEARANCE		
VEGETATION CLEARANCE		
WILDLIFE CLEARANCE		
PRE-BURN PREPARATION CHECKLIST	Specific Contacts	By/When
SEND COPIES OF APPROVED PLAN TO: SIFC, APPROPRIATE AIR QUALITY CONTROL DIST.		
BURN UNIT PREP WORK COMPLETED		
WEATHER STATION & FUEL STICKS ON SITE		
NOTIFY CITIZENS UTILITIES, CALTRANS, if burn will impact roads or utilities:		
ASSIGNED BURN PERSONNEL NOTIFIED. ALL NON-LNP PERSONNEL HAVE BEEN ORDERED THROUGH SIFC DISPATCH		
CONTROLLED BURN 48/72 HOUR NOTICE FAXED TO AIR RESOURCES BOARD (CARB) FAX# 445-0786 PH#322-6014		
BURN INFO SENT TO ALL FOUR AIR POLLUTION CONTROL DIST. & NE CALIF. AIR ALLIANCE MAIL LIST: ONE WEEK IN ADVANCE, 48 HOURS, & DAY BEFORE BURN		
ADJACENT LANDOWNERS NOTIFIED: LIST PRIVATE LANDOWNERS:		
PUBLIC INFO ANNOUNCEMENT COMPLETED & APPROVED BY SUPERINTENDENT (send out ASAP and day before burn,) also send copies to: Park Visitor Centers and Entrance Stations		
PARK DIVISION CHIEFS & SUPERINTENDENT NOTIFIED AT LEAST 1 WEEK IN ADVANCE		
SPOT FORECAST REQUESTED THROUGH REDDING WEATHER PH#221-1293 FAX# 246-5287		

Appendix 12: **Job Hazard Analysis**

United States Department of Interior NATIONAL PARK SERVICE	1.WORK PROJECT/ACTIVITY Prescribed Fire	2.LOCATION Lassen Volcanic NP	3.UNIT Emigrant
JOB HAZARD ANALYSIS (JHA)	4.NAME OF ANALYST Mike Careful	5.JOB TITLE Safety Officer	6.DATE PREPARED Aug. 20, 2000
7. TASKS/PROCEDURES	8. HAZARDS	9. ABATEMENT ACTIONS ENGINEERING CONTROLS * SUBSTITUTION* ADMINITSTRATIVE CONTROLS * PPE	
1. Hand Ignition	A. Proximity to intense heat and erratic fire behavior.	A. Use Personal Protective Equipment (PPE), maintain close supervision, use handheld radios, and lookouts. Thorough briefing on expected fire behavior. Adjust ignition patterns as needed to reduce exposure and fire behavior.	
	B. Smoke, sparks, cinders.	B. Avoid very dense smoke; wear PPE; rotate personnel out of worst areas.	
	C. Noise of fire obscures verbal warnings.	C. Handheld radios for all ignition personnel.	
	D. Burning fuel dripping from torch – operator burned.	D. Igniters stay alert to location of torch flame. Close air vent when not igniting. Wear proper PPE.	
	E. Ignitions in wrong location.	E. Thorough briefing of ignition plan. Know location of other igniters and personnel. Radios for all igniter. Close supervision.	
	F. Poor footing, heavy fuels accumulation.	F. Constant awareness; identify hazard areas; slow down.	
2. Driving to Work Site	A. General operations and public traffic.	A. Defensive driving techniques.	
	B. Unsecured loads.	B. Check loads for security before departing – use tie downs.	
	C. Hauling flammable substances.	C. Use appropriate containers for hauling drip torch fuels and gasoline.	
	D. Transporting sharp tools.	D. Use guards, cages, boxes or tool mounts.	
	E. Loading vehicles.	E. Use of proper lifting techniques.	
10. SUPERVISOR'S SIGNATURE /s/ Clark Kent		11. TITLE FMO/Burn Boss	12. DATE 8/23/XXXX

Job Hazard Analysis Instructions

The Job Hazard Analysis (JHA) shall identify the location of the work project or activity, the name of employee(s) writing the JHA, the date(s) of development, and the name of the appropriate supervisor approving it. The supervisor acknowledges that employees have read and understand the contents, have received the required training, and are qualified to perform the work project or activity.

Blocks 1, 2, 3, 4, 5, and 6: Self explanatory.

Block 7: Identify all tasks and procedures associated with the work project or activity that have potential to cause injury or illness to personnel and damage to property, material, or environment. Include emergency evacuation procedures.

Block 8: Identify all known or suspect hazards associated with each respective task/procedure listed in block 7. For example:

- e. Research past accidents/incidents
- f. Discuss the work project/activity with participants.
- g. Observe the work project/activity.
- h. A combination of the above.

Block 9: Identify appropriate actions to reduce or eliminate the hazards identified in block 8. Abatement measures listed below are in the order of the preferred abatement method:

- f. Engineering Controls (the most desirable method of abatement). For example, ergonomically designed tools, equipment and furniture.
- g. Substitution. For example, changing to non-flammable, non-toxic, biodegradable solvents.
- h. Administrative Controls. For example, limiting exposure by reducing the work schedule.
- i. PPE (least desirable method of abatement). For example, using hearing protection when working with or close to portable machines (chain saws, rock drills, portable water pumps).
- j. A combination of the above.

Block 10: The JHA must be reviewed and approved by a supervisor. Attach a copy of the JHA as justification for purchase orders when procuring PPE.

Block 11 and 12: Self explanatory.

JHA – Emergency Evacuation Instructions

Work supervisor and crew members are responsible for developing and discussing field emergency evacuation procedures (i.e., medical plan) and alternatives in the event a person(s) become ill or injured at the worksite and needs to be expediently transported from the scene.

Be prepared to provide the following information:

- k. Nature of the accident or injury (avoid using victim's name).
- l. Type of assistance needed, if any (ground, air, or water evacuation)
- m. Location of accident or injury, best access route into the worksite (road name/number), identifiable ground/air landmarks.
- n. Radio frequency(ies).
- o. Contact person.
- p. Local hazards to ground vehicles or aviation.
- q. Weather conditions (wind speed & direction, visibility, temp).
- r. Topography.
- s. Number of person(s) to be transported.
- t. Estimated weight of passengers for air/water evacuation.

These items listed above serve only as guidelines for the development of emergency evacuation procedures.

JHA and Emergency Evacuation Procedures Acknowledgement

As supervisor, I acknowledge that the following supervisors/crew leaders have participated in the development of this JHA and accompanying emergency evacuation procedures, and have also been briefed on the provisions, thereof, on September 2, XXXX. They will brief their subordinates on this JHA prior to implementation of the burn.

<u>/s/ Clark Kent</u> Supervisor's Signature	<u>Clark Kent, FMO/Burn Boss</u> Supervisor's Name
<u>Burn Boss</u>	<u>Engine Crew Leaders</u>
<u>Ignition Specialist</u>	<u>PSD Operator</u>
<u>Holding Group Supervisor</u>	<u>Helispot Manager</u>
<u>Prescribed Fire Monitors</u>	<u></u>
<u>Logistics/Finance</u>	<u></u>
<u>Hand Crew Supervisor</u>	<u></u>

Appendix 13: **Notification Checklist for Emigrant Prescribed Fire:**

Individual/Number to be Contacted	Contacted by	Contact Date	Contact Time	Comments
Bill McClaren, Chief Ranger 555.555.1000	Joe Smith	9/10/XXXX	0900	
Mary Shaw, Chief of Maint. 555.555.1001	Joe Smith	9/10/ XXXX	0905	
Paul Blazer, Chief of Interpretation 555,555,1002	Joe Smith	9/10/ XXXX	0910	
Sally Ride, Chief of Res. Mgmt. 555.555.1003	Joe Smith	9/10/ XXXX	0915	
Lassen National Forest Supervisor 555.544.1000	Joe Smith	9/10/ XXXX	0920	Message left with Secretary Bill Gates
Lassen National Forest FMO 555.544.1200	Joe Smith	9/10/ XXXX	0930	Message left with AFMO B. Kastro
Hat Creek District Ranger 555.544.1300	Joe Smith	9/10/ XXXX	1000	
Susanville Interagency Fire Center 555.555.1900				
Shasta County Air Quality District Manager 555.555.2000	Joe Smith	9/10/ XXXX	1100	Message left on voice recorder, will call again
NE Air Alliance Fax 555.554.2100	Joe Smith	9/10/ XXXX 48 hrs prior Burn Day	1100	Faxed Burn Info per Burn Plan
Private Home Owners				
Theresa Rich 555.555.9000	Joe Smith	9/10/ XXXX	1130	
Billy Buck 555.555.9999	Joe Smith	9/10/ XXXX	1135	
Mac Clary 555.555.9191	Joe Smith	9/10/ XXXX	1140	